Wholesale Markets for Fresh Fruits and Vegetables in Taipei

Technical Report No. 5

Regional Agribusiness Project
7250 Woodmont Avenue, Suite 200, Bethesda, Maryland 20814

DEVELOPMENT ALTERNATIVES, INC. ▪ Abt Associates Inc. ▪ Fintrac Inc. ▪ Technical Assessment Systems, Inc. ▪ DPRA Incorporated ▪ IMCC ▪ Land O'Lakes, Inc. ▪ Postharvest Institute for Perishables ▪ United Fresh Fruit and Vegetable Association ▪ GIC Agricultural Group

Wholesale Markets for Fresh Fruits and Vegetables in Taipei

by

Hsing-yiu Chen
Hong-wen Wann
Shu-hua Huang

April 1995

Prepared for the Regional Agribusiness Project, contract number AEP-0009-C-00-3057-00, with funding from the Asia and Near East Bureau of the U.S. Agency for International Development

PREFACE

This case study is a publication of the Asia Regional Agribusiness Project (RAP) financed by the U.S. Agency for International Development (USAID). RAP, a $5 million, four-year project, provides technical assistance to USAID Missions, their agribusiness projects, and clients in South and Southeast Asia. RAP's overall objectives are to promote market transparency, marketing efficiency, and environmentally sustainable trade and cooperative venture development, to raise employment and income in South and Southeast Asia. The project provides technical expertise in market information, environmental and food safety, trade and investment development, and economic analysis.

Horticulture has become an increasingly important source of food, employment, and export earnings in Asia. Unfortunately, the fanfare over the expansion of horticultural exports has contributed to the neglect of the performance of local marketing systems, especially urban wholesale marketplaces.

The Market Information component of RAP has been charged with developing a dynamic and effective research and development (R&D) program responsive to the problems facing wholesale marketplaces for fresh fruits and vegetables in capital cities throughout South and Southeast Asia. An important step in this R&D effort is the development of case study materials on successful urban wholesale marketplaces in Hong Kong, Singapore, and Taipei. These cases provide insights into what has worked and not worked, as well as into the reasons why.

This case study provides an overview of the island setting of Taiwan, its fruit and vegetable sector, the guiding role of planned market system improvements in the development of a dynamic agricultural sector, the coordinating position of the urban wholesale markets in the national market network, and characteristics of the country's wholesale marketplaces, their management practices, and their provision of services. This study enables reader to appreciate the fundamental role and problems of urban wholesale markets through which most Asian retailers and consumers receive their daily supplies of fruits and vegetables. Similarly, this study provides proof that farmers' organizations can be strengthened and marketing technologies quickly transferred to farmers through direct access to and active participation in major terminal markets. The approach used to encourage farmers' participation in Taipei's wholesale markets is applicable to many other Asian countries.

Urban officials, agricultural officers, infrastructure planners, marketing specialists, and others who are interested in knowing more about this R&D effort should inquire about materials and technical services available through RAP.

TABLE OF CONTENTS

LIST OF FIGURES, TABLES, AND MAPS

EXECUTIVE SUMMARY

In the mid-1950s, the Government of Taiwan supported a vigorous agricultural production program to return the island to its pre-World War II production levels for food crops. In less than a decade, this well-orchestrated support resulted in a strong commercial agricultural sector, characterized by aggressive marketing and producing sizeable surpluses for export, and a dynamic agroprocessing sector.

In the early 1970s, Taiwan embarked on a strong market development program emphasizing improvements in marketing infrastructure, market support services, and new linkages between producers and major market outlets in urban areas. Market-led strategies took shape through careful planning, guided investments, and skilled technical staff determined to accelerate growth in the agricultural sector. New terminal market facilities in Taipei and a new way of wholesaling fresh fruits and vegetables — auction transactions featuring direct access of farmers' associations to the major wholesalers — underpinned the market-led approach to agricultural development. National legislation on island-wide agricultural marketing created the necessary enabling environment.

Government initiatives have strengthened the bargaining position of farmers, improved postharvest handling practices, allowed cooperative marketing to flourish within the terminal marketplaces, and improved the price signals coming from the terminal markets to the producers. However, in the meantime, the rapid economic growth of the country has increased consumer incomes and led to a dwindling farm labor pool, factors that have dramatically changed today's agricultural situation in Taiwan. Although demand for fruits and vegetables has increased markedly, domestic production continues to decrease, imports have begun to exceed the previous large-scale exports, and the agricultural sector has become a less crucial contributor to the gross domestic product. All these developments reduce the ability of the wholesale marketplaces to act as a bridge between changes in consumer demand and farmers' ability to adjust rapidly to those changes.

This profile traces the evolution of the wholesale marketplaces in Taipei from the Old Central Market to new facilities. The shift to new facilities called for a substantial reconfiguration of trading practices — from the traditional, closed negotiation style to open auctions — and involved the private sector through joint investments in the new markets and through management by a semi-private-sector company instead of by public officials. The management company became the main source of marketing innovations including improved commodity handling procedures and packing-house technologies, and introduction of supermarkets as a new form of retail outlet. The merits of this management arrangement deserve wider recognition in other countries.

Still, more innovations are needed. The market share of imported commodities is apt to grow to compensate for decreasing domestic supply. Yet increasing numbers of fresh fruit and vegetable importers already are establishing their offices and shops outside the wholesale marketplaces because the marketplaces cannot accommodate them. As the wholesale facilities struggle to accommodate volume exceeding design capacity, overcrowding causes inefficient handling of goods, cold storage space cannot keep up with demand, structures are in need of repair, and management finds it difficult to be responsive to the concerns facing its staff.

New physical structures are not enough. The full scope of the marketing system must be understood and managed to ensure sustainable agricultural development. This report offers agricultural officials and urban planners in several South and Southeast Asia countries insights on reforming and managing marketing systems. One lesson is the importance of involving traders in designing new markets

so that they recognize their benefits and relocate in an orderly fashion. Another prominent lesson is the merit of having urban officials work closely with agricultural agencies to implement changes that accommodate the interests of both urban consumers and farmers. Market change is a continuous process. Planners should begin now to design markets that will accommodate changes expected in the next few years.

CHAPTER ONE

INTRODUCTION

The development of Taiwan's agricultural sector since World War II has been impressive. Government programs, farmers' efforts, and favorable domestic and international market conditions have contributed to agricultural growth and progress during this period.

Immediately after the war, the government promoted increased farm production, aiming to achieve pre-war levels. The pre-war level of production was reached after 10 years of intensive and continued effort. Government measures then focused on the modernization of the agricultural marketing system.

Major government efforts to promote agricultural market development during this period included the following:

- Construction of rice warehouses for farmers' associations to improve storage conditions. Most rice warehouses were badly damaged during the war-time.
- Installation of modern roller-type rice hulling machines to improve the recovery of rice in the milling process.
- Construction of packing houses for fruits and vegetables in the major producing areas to facilitate improved handling during assembly, grading, and packing of perishable commodities by small farmers.
- Construction of assembly markets in the main production areas and terminal markets in consumption centers for agricultural commodities to accommodate concentrated, open, and expeditious market transactions.
- Encouragement of cooperative marketing of hogs, fruits, and vegetables to enable small farmers to participate in the marketing process directly.
- Improvement in the management and operations of the marketing business handled by cooperatives.
- Improvement in grading and packing at the shipping point to enhance market value.
- Training of market personnel to equip them with modern marketing knowledge and expertise.
- Collection and dissemination of market information to help marketing participants make efficient marketing decisions.
- Promotion of large-scale retailing of perishable commodities to modernize retailing.

The above-mentioned measures constitute basic elements for agricultural market development and contributed significantly to the improvement of agricultural marketing in Taiwan. However, terminal wholesale markets, which play an important role in the marketing system, were neglected.

Effective performance of wholesale markets in the capital city is critical to a well-coordinated national trade network for fresh fruits and vegetables. Wholesale markets move agricultural products from farmers to consumers and exporters, and channel the distribution of imports to widely dispersed consumers at a reasonable price. Transactions in wholesale markets send signals to farmers and farmers' associations about the profitability of crop mixes, merits of increasing or decreasing shipments of particular commodities, and possible advantages of direct shipments to the marketplace.

Taiwan's experience with agricultural marketing development in general, and with wholesale marketplace improvements in particular, provides lessons for other developing countries striving to solve similar problems. This case study of Taipei wholesale markets for fresh fruits and vegetables is intended to share these lessons.

CHAPTER TWO

THE SETTING OF TAIWAN

This chapter describes Taiwan's geography, transportation and communications sectors, demographics, national income figures, consumption patterns, and domestic production and external trade in fruits and vegetables.

GEOGRAPHY

Taiwan is an island on the western rim of the Pacific Ocean, located 200 kilometers off the eastern coast of Mainland China and midway between Japan and the Philippines. With the Tropic of Cancer passing through the central part, the island proper stretches 386 kilometers from north to south or between 25° 56' N. and 21° 45' S. latitude and 137 kilometers across the widest point from east to west, or between 119° 18' W. and 124° 34' E. longitude. The total area of Taiwan ,including 86 small islands mostly found in Penghu Archipelago, is 36,000 square kilometers (Annex 1).

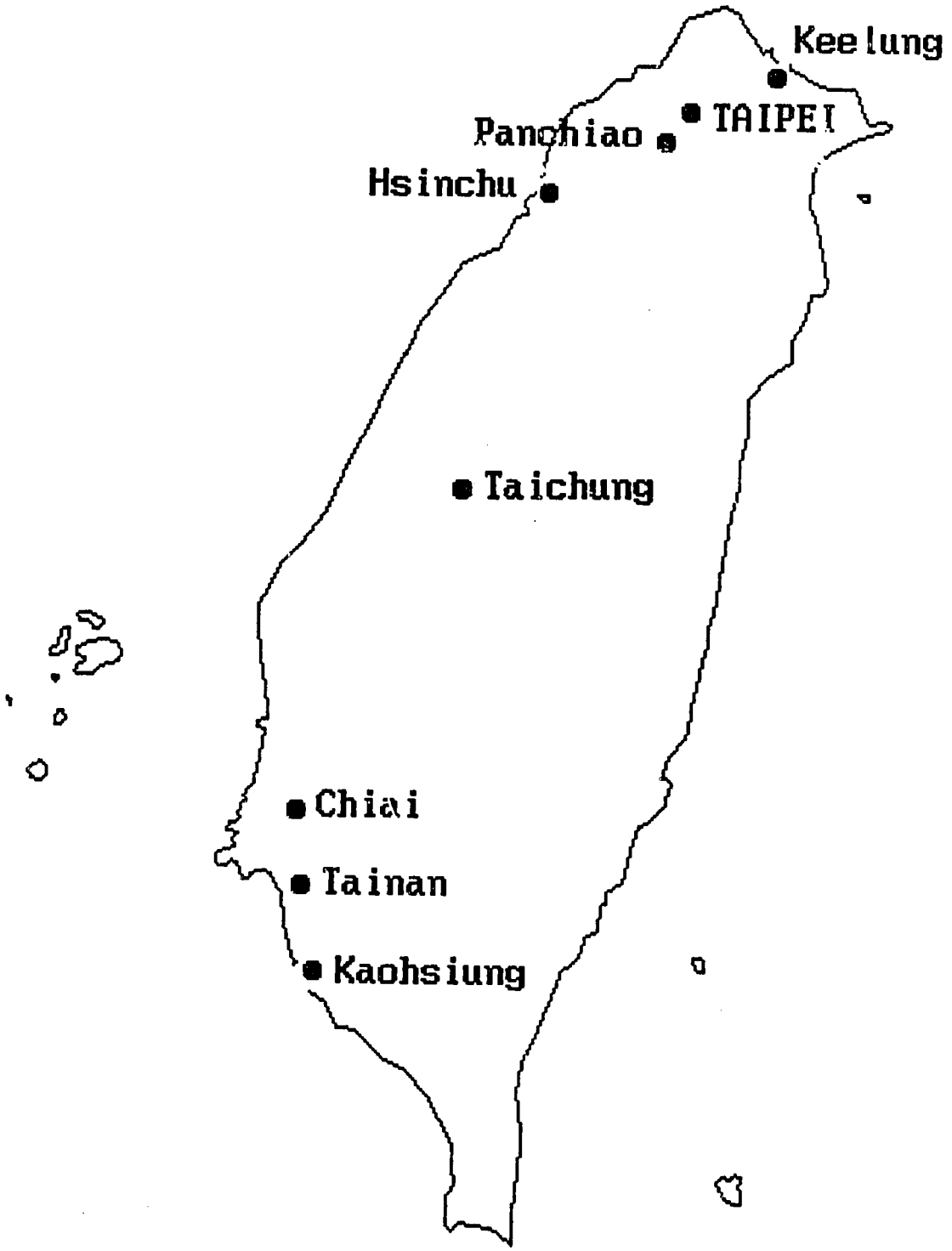
The climate of Taiwan is tropical and subtropical, characterized by high temperature and abundant rainfall. The average temperature in 1993, for instance, was 22.7°C in Taipei (in the north) and 25.2°C in Hengchung (in the south). Total precipitation in Chiayi in the heart of the major agricultural producing area was 1,348 millimeters in the same year. Crop production is practiced year round.

Two-thirds of the island is mountainous, mostly covered with lush forests. The Central Mountain chains running from the north to the south divide the island vertically into eastern and western parts. Eastern Taiwan is mountainous whereas the western part consists mostly of basins, slope land, and plains. At the southwest part of the island is the Chianan Plain, the largest and most fertile area on the island. This primary agricultural zone produces much of the rice, sugarcane, vegetables, and other food crops for the country (Annex 2). Because most of the agricultural activities are concentrated in the central and southern parts of the west coast, the major focus of agricultural marketing involves shipping farm products from the central and southern parts to the populated northern part of the island.

TRANSPORTATION AND COMMUNICATIONS

Because Taiwan is a small island, it has been able to build and upgrade its transportation and communication networks easily. In 1993, the track and route lengths of railway were 2,780 kilometers and 1,108 kilometers, respectively (Annex 3). The density of track or route length is considerable. The whole island is covered by a loop line railway that connects outlying areas and major cities. Railway density is 77 meters per square kilometer or 132 meters per 1,000 people (Annex 5).

MAP OF TAIWAN



The total length of highways is nearly 20,000 kilometers, of which about 87 percent is paved roads, 10 percent gravel roads, and 3 percent dirt roads (Annex 4). These highways do not include the country roads linking rural towns and villages or feeder roads connecting farms and houses. Highway density is 543 meters per square kilometers or 930 meters per 1,000 people (Annex 5).For the last 20 years, transportation of agricultural commodities has been done mostly by truck hauling, which is seen as more mobile than hauling by train.

International cargoes are loaded and unloaded at five harbors in Taiwan. They are Keelung in the north, Taichung in the center, Kaohsiung in the south, and Hwalien and Suao in the east of Taiwan island. In 1993, these harbors collectively handled loading and unloading of commodities totaling 384 million metric tons — 63 percent are handled at Kaohsiung Harbor, 23 percent at Keelung Harbor, 10 percent at Taichung Harbor, and 4 percent at other two harbors (Annex 6). Annex 7 shows the location of the major transportation infrastructure.

Telephones are popular in Taiwanese households. At present, the number of telephone subscribers per 100 people is 38 for all of Taiwan, 60 for Taipei, 46 for Kaohsiung City, 58 for Taichung City, and 56 for Tainan City (Annex 8). With an average family size of 3.8 people, these figures suggest that each family has more than 1.5 telephones. Undoubtedly, the telephone is an important means of communications even in the rural areas of Taiwan.

At present, 74 newspapers, 4,761 periodicals, 231 news agencies, and 4,112 publishing companies are registered with the government. Statistics on the number of copies of daily newspapers printed are not available, but other, official statistics show that 66 percent of the families subscribe to at least one kind of daily newspaper. In addition, 99 percent of the families have one or more color television sets, and each family has one or more radios. These are the media through which most people receive information about agricultural commodities.

DEMOGRAPHICS

The total population of Taiwan at the end of 1993 was about 21 million — 11 million male and 10 million female. The population growth rate was more than 3 percent per year during the 1950s, but gradually dropped, to about 1 percent in 1990 (Annex 9). The population density is very high: 582 people per square kilometers of land or 2,395 people per square kilometers of cultivated land (Annex 10). In 1993 the birth rate was 1.56 percent, and the death rate 0.53 percent, resulting in a 1.03 percent rate of natural increase.

The population size of the five major cities is listed in Annex 11. That table shows that 5.94 million people, or about 28 percent of the total population, live in the five major cities. Twenty years ago, these five cities accounted for 27 percent of the total population. Now, population is concentrating more in the fast growing, small and medium-sized cities and in suburban areas of the population centers.

Farm families number 822,000 or about 15 percent of the 5.5 million total households.

In 1993, total employment was 8.75 million, of which 1.00 million was in primary industry (including agriculture and fisheries), 3.42 million in secondary industry (including mining manufacturing, construction and utilities), and 4.32 million in tertiary industry (including commerce, transportation and other services) (Annex 12). In other words, the share of the employment by industry is 12 percent in

primary, 39 percent in secondary, and 49 percent in tertiary. Although employment in primary industry has decreased in recent years, tertiary industry employment has gained significantly. This trend is expected to continue.

NATIONAL INCOME

Per capita gross national product (GNP) at current prices in 1993 is US$10,566, up from US$196 in 1952, an increase of more than fiftyfold in 40 years.[1] The annual growth rate of GNP in the recent decade is 8.1 percent (Annex 13). Per capita GNP in Taiwan ranks fourth among Asian countries, following Japan, Hong Kong, and Singapore.

Agriculture's contribution to the gross domestic product (GDP) in 1993 was only 3.5 percent , compared with 56 percent by the service sector and 41 percent by the industrial sector. Agriculture's share in GDP has dropped from 32 percent in 1952 to 3.5 percent in 1993 (Annex 14).

Because rural areas are quite well urbanized, there is practically no income variation between rural and urban residents. However, the income difference is very significant among different occupations.

Jobs that require high technical competence, such as those in the electricity, gas, and water utilities, pay much higher salaries than do jobs that need no technical skills, such as sales positions in stores or assembly line jobs in factories.

Total household disposable income of Taiwan in 1993 was NT$4,032 billion (US$151 billion), NT$735,127 (US$27,609) per family. The average propensity to save was 20 percent, and the average propensity to consume was 80 percent. This means that, on average, people spent 80 percent of their disposable income for consumption and saved the remaining 20 percent. The marginal rate is somewhat higher for the propensity to consume and somewhat lower for propensity to save (Annex 15).

CONSUMPTION PATTERNS

In 1992, per capita consumption, more precisely food availability as measured in the food balance sheets, was 64 kilograms of rice , 115 kilograms of vegetables, 100 kilograms of fruits, and 66 kilograms of meat (Annex 16). During the past two decades, rice consumption has decreased dramatically, from 134 kilograms in 1970 to 64 kilograms in 1992. The consumption of vegetables, fruits, and meats, in contrast, has increased significantly, from 85 kilograms, 46 kilograms, and 25 kilograms in 1970 to 115 kilograms, 100 kilograms, and 66 kilograms respectively in 1992. The general trend is away from starchy foods including rice and sweet potatoes toward more vitamin-rich foods, such as vegetables and fruits, and more protein- and fat-rich foods, such as meats. The average nutrition intake from all foods in 1992 was 2,981 calories of energy, 91 grams of protein, and 143 grams of fat per day. The changing food

[1] Throughout this report, the local currency, the New Taiwan Dollar (NT$), is converted into U.S. dollars (US$) using exchange rates for the respective year, as shown in Annex 30. When there are buying and selling rates, the average of the two rates is used.

consumption pattern can be explained by the increasing income and rising living standard of the general public.

In 1992, 24.1 percent of individual spending was for foods, 3.1 percent for beverages, and 1.6 percent for tobacco. Food consumption accounts for 29 percent of total consumption expenditures. In other words, the Engel's coefficient was 23 percent in that year if beverages and tobacco are considered as foods. (Total consumption expenditures were 80 percent of income.)

AGRICULTURE — VEGETABLES AND FRUITS

The area of land devoted to vegetable production in 1993 was 181,000 hectares, yielding 2.8 million metric tons of vegetables. Peak production was recorded in 1984 when harvested area reached 230,000 hectares and production reached 3.4 million metric tons Both harvested area and production have declined in recent years (Annex 17).

The harvested area of fruit was 199,000 hectares, and total production was 2.6 million metric tons in 1993. Both the harvested area and total production have increased steadily during the past decade. This trend is expected to continue.

Both vegetables and fruits are rapidly growing farm enterprises among Taiwan's relatively declining agriculture. The index number of vegetable and fruit production, taking 1991 as the base, increased from 27.0 for vegetables and 6.2 for fruits in 1952 to 100.7 for vegetables and 104.1 for fruits in 1993. This implies that during the last four decades, vegetable production has grown fourfold, whereas fruit production has expanded by nearly seventeenfold. In 1993, vegetables accounted for 11 percent of the total value of farm production, and fruits accounted for 18 percent.

The breakdown of fruit production in 1993 is presented in Annex 18. A subtropical and tropical country, Taiwan produces many kinds of fruits in roughly equal quantities. The most important are bananas, pineapples, and citrus fruits, which combine to account for one-third of total production. Other important fruits include mangos, grapes, papayas, betel nuts, guavas, longans, and pears. Production of bananas and pineapples has been declining, and citrus fruit production has been stagnating, yet other higher-value items have been growing steadily.

The details of vegetable production in 1993 are shown in Annex 19. Items that carry the highest weight in vegetable production are bamboo shoots, watermelon, cabbage, tomatoes, radish, carrot, and cantaloupe. Roughly speaking, root vegetables account for 10 percent of total production; stem vegetables for 30 percent; leafy vegetables for 20 percent; fruit vegetables for 20 percent; and melons, mushrooms, and others for another 20 percent. In recent years, production of root vegetables has been stagnating, but production of leafy and fruit vegetables has been growing significantly.

The geographical distribution of the production of rice, vegetables, citrus fruits, pineapples, and hogs in 1993 is presented in Annexes 20, 21, 22, 23, and 24, respectively. As these maps make plain, production of most vegetables, fruits, and hogs is concentrated in the central and southern parts of the island, whereas the production of rice is more evenly distributed. Marketing of these products, thus, involves shipping from the central and southern areas to the northern part of the island.

EXTERNAL TRADE

For two decades after World War II, Taiwan was a net exporter of agricultural goods. Early in this period, exports of primary and processed agricultural products accounted for more than 90 percent of the total exports. Even in the 1960s, agricultural exports exceeded agricultural imports, resulting in a positive balance in agricultural trade.

Since 1970, primarily because of the fast growth in imports of farm products, agricultural trade has been in the red year after year. The trade deficit in agriculture hit a record US$3.2 billion in 1993.

In 1993, total exports of Taiwan reached US$85 billion, and total imports amounted to US$77 billion, leaving a trade surplus of about US$8 billion. Agricultural exports the same year were US$4 billion or about 5 percent of total exports, while agricultural imports were more than US$7 billion or about 10 percent of the total imports. The slow increase in agricultural exports and rapid growth in agricultural imports combined to widen the trade gap in agriculture year by year (Annex 25).

Exports of fresh and preserved vegetables in 1993 were US$264 million, up from US$5.5 million in 1961, an increase of forty-eight-fold in 30 years. Vegetable imports were US$100 million in 1993, up from US$0.8 million in 1961, an increase of one-hundred-twenty-five-fold in the same period. At present, the trade balance in vegetables is still favorable in value, although the surplus is declining relatively rapidly from the peak of US$458 million in 1987 to US$163 million in 1993 (Annex 26). However, the balance of trade in volume of fresh and processed vegetables became negative in 1993, when imports exceeded exports by more than 27,000 metric tons (Annex 27). With declining competitiveness in the vegetable sector caused mainly by wage increases and shortages in farm labor, exports of vegetables are expected to decrease rapidly and imports to grow significantly. The export surplus in value of vegetables will soon disappear or become a deficit.

In 1993, 80 percent of vegetable exports in terms of value were shipped to Japan, including onions, cabbages, carrots, and vegetable soybean; more than 50 percent of vegetable imports by value were supplied by the United States, including fresh, frozen, preserved, and canned vegetables.

Trading of fruits, both fresh and preserved, is similar to that of vegetables. Exports of fruits increased continually until 1981, then began fluctuating downward year after year. Imports of fruits, in contrast, have increased steadily and reached the US$300 million mark in 1992. Before 1987, export earnings from fruits showed a surplus. But, starting in 1988, Taiwan became a net importing country of fruits. In 1993, fruit exports were US$169 million, whereas fruit imports were US$293 million, resulting in a net deficit of US$123 million (Annex 28). Imported fruits are beginning to claim a substantial share in the Taiwan market for fruits (Annex 29).

Japan is the primary destination of Taiwan's fruit exports (74 percent); the United States is the primary supplier of Taiwan's fruit imports (56 percent). Details are shown in Annexes 30 and 31.

CHAPTER THREE

HISTORICAL SITUATION OF TAIPEI WHOLESALE MARKET

Urban wholesale markets for fresh produce do not suddenly appear; they emerge gradually as traders meet to sell, buy, and distribute fresh fruits and vegetables hauled in from major production areas. This chapter describes how a wholesale marketplace was carefully planned and built to replace the city's overcrowded Central Market. Site selection, financing, construction considerations, operating rules, and management arrangements are discussed.

OLD CENTRAL MARKET

There was one wholesale market for fruits and vegetables in Taipei prior to World War II. Located in the middle of old Taipei, this market was called Taipei Central Market. There, jobbers sold fruits and vegetables that had been shipped to the city from producing areas of the country on consignment to Taipei retailers.[2]

The Central Market covered 3,600 Pin (11,880 square meters) and had buildings with 1,690 Pin (5,577 square meters) in floor space. About 479 vegetable jobbers, each occupying a small area, did business independently in the market. This included receiving arrivals from the shippers or growers, breaking down the lots into smaller units, wholesaling the commodities to the retailers through direct price negotiations, collecting sales proceeds from the buyers, and remitting the proceeds to the suppliers after deducting a 10 percent handling charge. Jobbers paid 3.2 percent to market administrators for the use of the market space and facilities. All market properties belonged to the municipal government.

Fruit jobbers, numbering about 300, did not operate in the market proper. Instead, they worked from stores adjacent to the Central Market that they owned or leased from private sources. The fruit jobbers' business activities were similar to those of the vegetable jobbers, although fruit jobbers had different suppliers and buyers. Because the fruit jobbers did not do business in the market, they did not pay market fees.

SEARCHING FOR A NEW MARKETING SYSTEM

Immediately after World War II, the Taipei Central Market became the property of the new city government. A nine-member management committee with five representatives from the city government and four from the City Farmers' Association was organized to take charge of market management. A manager and 50 full-time employees were hired by the market to perform routine work and maintenance.[3] Wholesale transactions were handled by jobbers who had been doing business there since before the war.

---

[2]The term "jobbers" is used variously in this report. It is a job title for someone whose marketplace responsibilities may combine commission activities, wholesale supplying, and other forms of trade representing farms and shippers from supply areas.

[3]The number of full-time employees increased to 95 in 1973, the last year of the Central Market's existence.

During the 1960s, the market's inability to facilitate the smooth flow of fruits and vegetables became evident. Analysis of the situation by marketing professionals at that time and feedback from the farm community revealed underlying problems including the following:

- **Decentralized transactions.** Because so many jobbers conducted transactions independently, prices were inconsistent with the supply and demand situation of the market as a whole.

- **Secrecy surrounding transaction prices.** No one except the individual seller and buyer knew the exact prices. Thus, the farmers and market officials suspected that jobbers gained at the expense of the supplier through under-reporting both price and quantity sold.

- **Delayed payments.** Remittance of sales proceeds to the shipper or producer was the responsibility of the jobber. Suppliers frequently complained of delays and even delinquency of payment.

- **Distortion of demand and supply signals**. Independent transactions conducted in secrecy did not generate accurate data on price and volume of transactions. Thus, the market did not function well to send signals for supply and demand adjustment promptly.

- **Overcrowding**. Located near the downtown area of Taipei, the market had no space for expansion. It was unable to accommodate the rapidly increasing volume of transactions.

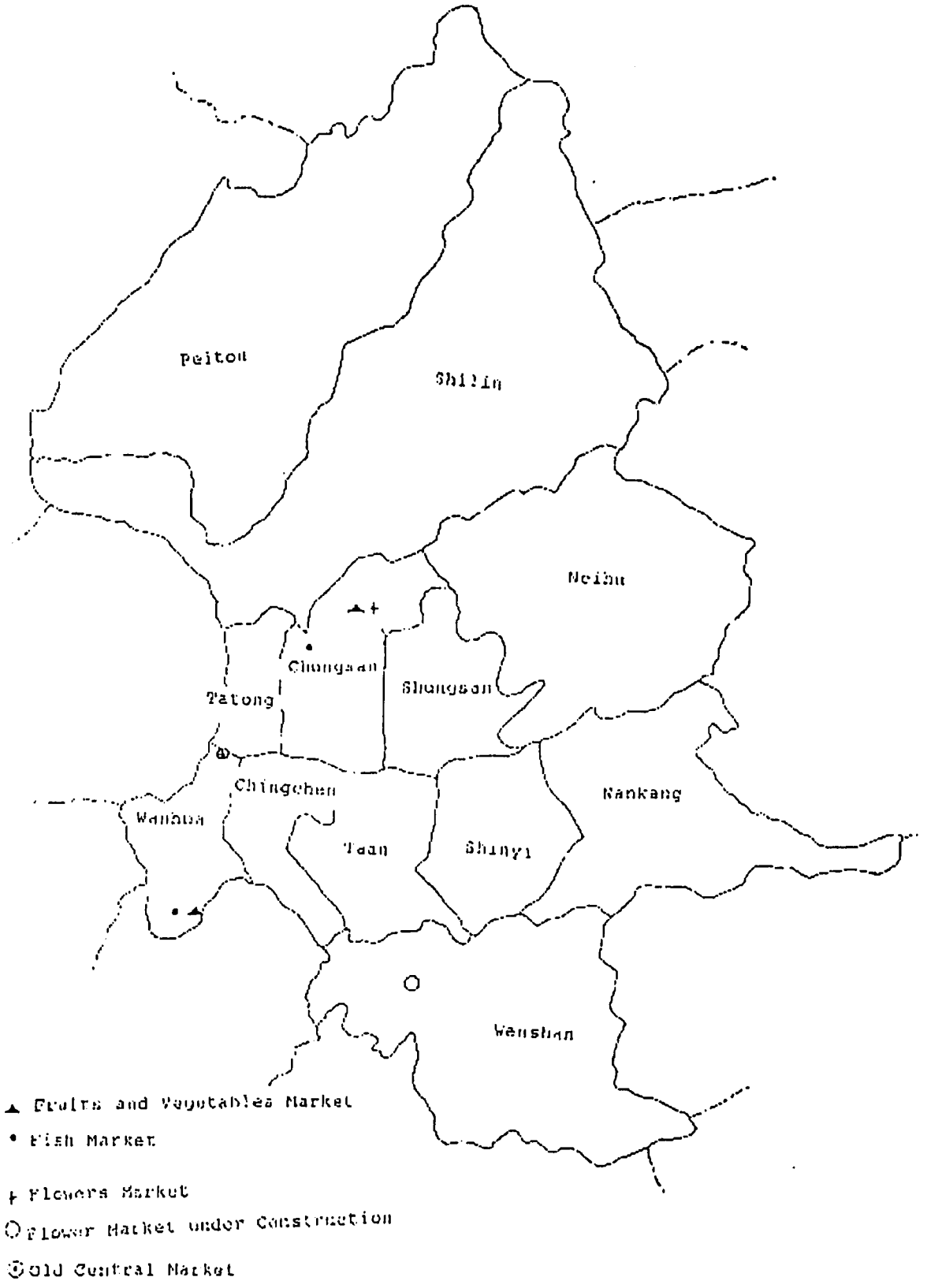
After lengthy, repeated discussions and meetings, the Taipei municipal government was finally convinced to construct a new wholesale market for fruits and vegetables in 1968, at which time it started to look for a new market site. The Reconstruction Bureau of the municipal government, which was responsible for this task, located 10 vacant lots for consideration. After site inspections, bureau staff decided that the vacant areas were too small.

SITE OF THE WHOLESALE MARKETPLACE

In 1969, the Reconstruction Bureau finally discovered a vacant piece of land located in the southwest corner of the city that was spacious enough for the construction of the new market. The land was originally assigned to and reserved for the construction of an abattoir and livestock market and covered an area of about 20,850 Pin (68,810 square meters). With the investment of a Chinese-American, the abattoir had already been constructed in Taoyuan, about 20 kilometers south of Taipei, thus leaving this piece of land idle. Because both the abattoir and the wholesale market were considered public facilities, revision of the city plans to change the land use from abattoir to wholesale market did not cause any difficulties and was completed quickly (Figure 1).

FIGURE 1

LOCATION OF WHOLESALE MARKETS IN TAIPEI



FINANCING

This land was owned by private landlords. Thus, the government had to go through an expropriation procedure for the compulsory purchase of land at a cost much lower than the market price. The government had to compensate the owner for the standing crops and existing structures. It took about two years, from 1971 to 1972, to complete the expropriation process and acquire the title of land ownership for market construction.

At this time, there was also the mandate to move the old fish market, which was adjacent to the old Central Market. Thus, the municipal government divided the newly acquired land into two parts: about 80 percent of the space, or 55,043 square meters for a fruit and vegetable market, and the remaining 13,767 square meters was to be used for construction of a fish market. The total cost for expropriating the land and compensating the owner for the standing crops and existing structures amounted to NT$27,425,878 (US$685,647). The prorated cost for the fruits and vegetables market was about NT$21,940,702 (US$548,518). The investment for the land was all financed by the municipal government through its annual budget. The ownership of the market, thus, belongs to the municipal government. Today such expropriation of city land would be extremely difficult and expensive.

The layout and architectural design of the marketplace took one year (1972) to complete. The layout emphasized maximum use of the land, the most precious resource and the limiting factor involved. Designers studied the merits and shortcomings of markets in Japan. The layout and detailed engineering design were awarded to a local architecture firm on a fee basis.

CONSTRUCTION

Construction started in October 1973 and was completed in January 1975. The new wholesale market began operation on December 1, 1974, and the old Central Market closed on the same date. The construction of the new market cost NT$66,706,340 (US$1,667,659) and again was completely financed by the annual budget of the municipal government. The land and buildings of the market are all the property of the municipal government, which collects 10 percent of the market fees from the market management for use of the land and market facilities.

RULES AND REGULATIONS

Prior to 1980, the organization, operation, and management of wholesale markets for agricultural commodities including fruits and vegetables, livestock, and fish were governed by the Regulations Governing the Management of Wholesale Markets for Agricultural Products, promulgated by the provincial government and the Taipei municipal government. These were administrative orders and had limited power for enforcement.

On August 5, 1981, the President signed the national Agricultural Commodities Market Transaction Law. In contrast to the original regulations, which covered only matters related to wholesale markets, the new law covers all marketing functions, from assembly to retailing. In addition, this law has the legal power for enforcement.

The provisions of the market transaction law include government marketing planning, cooperative marketing, wholesale transactions, and retail transactions. Most of this law — 23 articles out of 35 — is related to wholesale markets.

The important stipulations of the law regarding wholesale markets are as follows:

- Establishment of a wholesale market requires securing permits from the competent government authorities in advance.

- The operational entity of a wholesale market should be a farmers' organization; legal entity organized by the government and farmers' associations jointly; legal entity organized by the local government; or legal entity organized by the government, farmers' organizations, and shippers of agricultural products.

- The wholesale market is authorized to use public or expropriated private land as the market site.

- Taxes on the land and building of the wholesale market are to be reduced to half the ordinary rate.

- Growers, farmers' organizations, agribusiness enterprises, shippers, and importers can register with the market to become suppliers.

- Retailers, secondary wholesalers, shippers, exporters, processors, and institutional consumers, after obtaining a license from the competent government authorities, can be buyers or wholesalers at the wholesale market.

- The seller or buyer should not be the buyer or seller concurrently in the same wholesale market.

- The first wholesale transaction of agricultural products should be conducted in the local wholesale market. In other words, wholesale transactions outside the marketplace are prohibited.

- Transactions in the wholesale market should be carried out by auction, bilateral price negotiation, posted-price, or open tender method.

- The wholesale market may collect service charges from sellers and buyers within the limit approved by the national and municipal government. In the by-law, the ceiling of the service charge is stipulated as 5 percent for fruits and vegetables, 2.5 percent for fish, and 1.5 percent for livestock and meat.

- Market authorities should make payment to suppliers no later than three days after completion of transactions. Buyers should pay market authorities all sales proceeds plus 1.5 percent market fees three days after transactions.

MANAGEMENT ARRANGEMENTS

To improve the marketing of fruits and vegetables — specifically, to solve the problems identified previously in this report — the Executive Yuan or central government, mapped out and promulgated on February 25, 1974, a work plan called "Plan for Organizing an Island-wide Agricultural Marketing Corporation."

The major objective of this plan was to streamline the flow of agricultural products, including fruits, vegetables, hogs, and fish, from producers to consumers. As a first step, this plan called for the establishment of a fruit and vegetable marketing corporation to be responsible for the operation and management of the new fruit and vegetable wholesale market under construction in Taipei. The initial capital investment of the corporation, NT$200 million (US$5,263,157 at 1974 rate), was subscribed by the following parties:

- Taipei Municipal Government — 24 percent
- Taiwan Provincial Government — 24 percent
- Related Farmers' Associations — 26 percent
- Fruit Marketing Cooperative, Shippers, and Wholesalers of the Market — 26 percent

Because government entities subscribed to only 48 percent of the total capital, the corporation is considered a private company. The corporation was formally inaugurated on October 10, 1974, and started operating the wholesale business of the new market on December 1.

First named the Taiwan Fruits and Vegetables Marketing Corporation, the corporation was renamed in May 1984 as the Taipei Agricultural Products Marketing Corporation (TAPMC). TAPMC, which receives shipments of fruits and vegetables from shippers and producers on consignment, sells the arrivals by auction to the wholesalers operating in the market and collects 3 percent fees (new rate since January 1, 1988) on the sales proceeds. Fees are shared equally by both the seller and the buyer. TAPMC essentially became the sole jobber in the wholesale market and acts as an intermediary but never buys and resells the commodity in the market.

Fruit and vegetable jobbers from the old Central Market were all moved to this market and became either shippers (suppliers) or wholesalers (buyers). Instead of receiving shipments directly, as they once did, wholesalers have to participate in the auction to acquire commodities.

The original fruit and vegetable jobbers were provided with the rights free of charge to do business in the new market. Seeing this as a better business opportunity for the future, all of them followed the government suggestion to continue their business at the new market. At present, there are 422 fruit wholesalers and 688 vegetable wholesalers registered in the new market. In addition, there are 155 fruit and 525 vegetable retailers or institutional consumers who participate in the auction but do not resell the commodity within this marketplace. Instead, they transport their purchases for retail sales or institutional use outside the market.

In 1985, the municipal government completed a second fruit and vegetable market in the central district of the city and again commissioned the operation of this market to TAPMC. The second market was inaugurated in September 1985. The second market is about one-third the size of the first market in land space and business volume.

CHAPTER FOUR

CURRENT WHOLESALE MARKET SITUATION

This chapter explains the current wholesale market situation including transactions, current facilities and their condition, and market operations. Considerable debate and planning are under way for the expansion of these facilities to keep pace with the evolving nature of today's marketing system needs.

ISLAND-WIDE SITUATION

At the end of 1993, there were 160 wholesale markets for agricultural commodities operating on the island of Taiwan. Of these markets, 71 were fruit and vegetable markets, 24 livestock (meat) markets, and 65 fish markets.

The 71 fruit and vegetable wholesale markets owned floor space of 694,755 square meters in buildings, including 221,614 square meters in transaction halls. The average floor space of transaction halls is 3,121 square meters per market. Employing 1,638 full-time workers (averaging 23 workers per market), these markets handled 2,229,778 metric tons of fruits and vegetables (31,405 metric tons per market on average) in 1993.

Of total national production, about 41 percent of vegetables and 47 percent of fruits were bought and sold in these markets. The remaining vegetables and fruits were handled by dealers in areas without wholesale markets, sold by growers directly to retailers or to consumers in suburban areas, procured by supermarkets from production areas, supplied to food processors, and exported. However, in recent years, wholesale markets have increased their market share.

All of the markets operate daily except for two holidays each month. Of the 71 wholesale markets, 31 were operated by the local farmers' associations (multipurpose farmers' cooperatives) and 40 were operated by companies jointly organized by the local farmers' association and local government. By law, these markets are authorized to collect a market fee of no more than 5 percent of the sales proceeds, to be borne equally by both seller and buyer, to finance the operation and management of the marketplace.

TAIPEI MARKETS

Two of the 71 fruit and vegetable wholesale markets are located in Taipei. These two markets, operated by TAPMC, employ 346 full-time workers and accomplished transactions amounting to 623,042 metric tons of fruits and vegetables in 1993. In terms of number of employees, the Taipei markets account for 21 percent of market employees nationwide, and in terms of throughput, they handle 28 percent of the total volume. The Taipei markets are, thus, by far the most important wholesale markets.

The transaction volume of fruits and vegetables in the Taipei wholesale markets is shown in Tables 1 and 2. In 1975, the markets' first full year of operation, 388,514 metric tons of fruits and vegetables

TABLE 1

TRANSACTION VOLUME OF TAIPEI FRUIT AND VEGETABLE WHOLESALE MARKETS (I)
(metric tons)

Year	1st Market	2nd Market	Total
1975	388,514	0	388,514
1976	446,911	0	446,911
1977	450,404	0	450,404
1978	470,242	0	470,242
1979	501,678	0	501,678
1980	525,233	0	525,233
1981	500,886	0	500,886
1982	506,626	0	506,626
1983	533,657	0	533,657
1984	542,749	0	542,749
1985	538,919	14,070	552,999
1986	508,303	54,536	562,839
1987	503,393	67,629	571,022
1988	527,763	69,247	597,010
1989	506,816	69,184	576,000
1990	485,824	73,757	559,581
1991	528,523	84,670	613,193
1992	510,439	90,611	601,050
1993	519,360	103,682	623,042
Annual Growth Rate (%)	1.64	9.60*	2.65

Note: Date of Inauguration
1st market, December 1, 1974
2nd market, September 2,1985
* Because the statistics for 1985 did not cover a whole year operation, of the second market, the 1985 figure was omitted from the calculation of growth rate.

TABLE 2

TRANSACTION VOLUME OF TAIPEI FRUIT AND VEGETABLE WHOLESALE MARKETS (II)
(metric tons)

Year	1st Market		2nd Market		TOTAL	
	Vegetable	Fruit	Vegetable	Fruit	Vegetable	Fruit
1975	221,190	167,324	-	-	221,190	167,324
1976	249,460	197,451	-	-	249,460	197,451
1977	248,543	201,861	-	-	248,543	201,861
1978	272,810	197,432	-	-	272,810	197,432
1979	269,434	232,244	-	-	269,434	232,244
1980	279,541	245,692	-	-	279,541	245,692
1981	265,992	234,894	-	-	265,992	234,894
1982	299,503	207,123	-	-	299,503	207,123
1983	310,559	223,098	-	-	310,559	223,098
1984	328,699	214,050	-	-	328,699	214,050
1985	319,076	219,853	9,652	4,418	328,728	224,271
1986	298,990	209,313	38,790	15,746	337,780	225,059
1987	296,826	206,567	41,890	25,739	338,716	232,306
1988	312,089	215,674	44,463	24,784	356,552	240,458
1989	306,742	200,074	47,059	22,125	353,801	222,199
1990	296,778	189,046	50,281	23,476	347,059	212,522
1991	317,813	210,710	56,292	28,378	374,105	239,088
1992	316,735	193,704	58,822	31,789	375,558	225,493
1993	311,515	207,845	60,805	42,877	372,320	250,722
Annual Growth Rates (%)	1.93	1.20	6.66*	15.37*	2.94*	2.28*

Note: Date of Inauguration
1st market, December 1, 1974
2nd market, September 2,1985
* Because the statistics for 1985 did not cover a whole year of operation of the second market, the 1985 figure was omitted from the calculation of growth rate.

were transacted. In 1993, the transaction volume increased to 519,360 metric tons, accounting for an average annual growth rate of 1.64 percent. In the second market, which started business in 1985, the transaction volume increased from 14,070 metric tons in the first year to 103,682 metric tons in 1993, recording an average annual growth rate of 9.60 percent in this period. Of the total transactions, 40 percent are fruits and 60 percent are vegetables.

Only the wholesale markets in Taipei use the auction form of transaction. All other markets use negotiated price for their transactions.

TRANSACTIONS OF FRUITS AND VEGETABLES

The transaction volume of the 10 major fruits and vegetables in 1993 is presented in Table 3. Watermelon ranked first among fruits, accounting for 16 percent of the total transaction volume of fruits. Cabbage ranked first among vegetables, accounting for 11 percent of the total transaction volume of vegetables. The 10 major fruits accounted for 60 percent of fruit transactions, and the main 10 vegetables claimed a 50 percent share of the vegetable market.

The fruits with highest sales in 1993 were watermelon, citrus fruits, guava, and cantaloupe. Bananas and pineapples ranked lower on the list of top 10 sellers because most fruits that are exported or processed are not brought to wholesale markets. Most bananas go to the export market, and most pineapples are used for raw material in canneries.

In terms of 1993 transaction volume, the major vegetables in the Taipei wholesale markets were cabbage, Chinese cabbage, radishes, sweet corn, and scallions.

Domestically grown fruits and vegetables constitute the largest share of produce sold in the Taipei wholesale markets. Because they are marketed through separate channels and tend to be specialty products, imported vegetables are not sold in the Taipei markets in large volumes. However, when natural hazards damage local production, and prices are skyrocketing, imports are sold in these markets.

TABLE 3

MAJOR VOLUMES OF FRUIT AND VEGETABLE TRANSACTIONS IN THE TAIPEI MARKETS, 1993

ITEM	QUANTITY (metric tons)	% of TOTAL
Fruit	250,722	100.0
1. Watermelon	41,203	16.4
2. Citrus-liucheng	18,353	7.3
3. Guava	16,285	6.5
4. Cantaloupe	16,011	6.4
5. Citrus-ponkan	12,812	5.1
6. Mango	12,374	4.9
7. Wax Apple	9,213	3.7
8. Banana	9,033	3.6
9. Pear	8,794	3.5
10. Pineapple	8,658	3.5.
Vegetable	372,320	100.0
1. Cabbage	41,766	11.2
2. Chinese Cabbage	36,572	9.8
3. Radish	22,511	6.1
4. Sweet Corn	17,341	4.7
5. Scallion	14,660	3.9
6. Tomatoes	12,557	3.4
7. Sponge Gourds	10,514	2.8
8. Lettuce	10,216	2.7
9. Celery Cabbage	9,488	2.6
10. Bamboo Shoot	8,962	2.4

Source: *Taipei Agricultural Products Marketing Corporation Statistical Yearbook*, 1994 edition, Taipei Agricultural Products Marketing Corporation.

TABLE 4

MAJOR IMPORTED FRUITS SOLD IN THE TAIPEI FRUIT AND VEGETABLE MARKETS, 1981-1993
(metric tons)

Year	Apples	Grapes	Grapefruits	Kiwi Fruits	Valencia Oranges	Total*
1981	12,781	556	10	0	439	15,420
1982	6,669	1,133	10	0	508	10,158
1983	7,962	704	179	0	1,307	10,891
1984	5,248	613	447	59	599	7,310
1985	4,909	1,135	582	114	1,056	8,099
1986	7,003	2,290	1,843	347	1,048	13,173
1987	8,001	2,583	3,026	761	2,720	18,933
1988	9,637	1,568	4,503	933	1,670	20,926
1989	7,520	1,858	3,716	1,713	1,811	19,382
1990	7,338	1,405	1,055	2,333	2,220	18,345
1991	6,163	1,370	1,741	2,439	1,416	18,336
1992	8,391	2,032	2,250	2,808	3,046	26,304
1993	7,367	1,767	1,859	3,471	2,330	23,347

*Includes other items such as plums, peaches, cherries, lemons, watermelons, and pears.

MARKET FACILITIES

The major facilities and structures of the new market are detailed in Table 5.

TABLE 5

ALLOCATION OF SPACE IN THE NEW MARKET

Area or Structure	Land Area M^2	% of Total Space
Office buildings	3,661	6.7
Auction hall	8,990	16.3
Vegetable wholesale area	9,806	17.8
Fruit wholesale area	8,660	15.7
Watermelon transactions shed	1,980	3.6
Cold storage	3,477	6.3
Packing area	748	1.4
Other	17,721	32.2
Total	55,043	100.0

Market facilities cover about 66 percent of the total land area, leaving the balance for parking areas, intramarket roads and passageways, and the like. In addition, there are a sewage works for the exclusive treatment of market sewage and a container yard for the temporary storage and custody of empty packing containers, such as plastic crates that can be reused.

The ground layout of this market is shown in Figure 2. The layout of the second market is shown in Figure 3.

Wholesalers in the market do not have the right to the property but use the wholesale space or stalls free of charge. They pay the electricity and water bills and their share of the cleaning expenses for the space reserved for their exclusive use. They have to install their own telephones and FAX machines and are responsible for the expenses related to installation and use of both. Some wholesalers lease walk-in refrigeration units and install them in the market at their own expense.

FIGURE 2

GROUND PLAN OF FIRST TAIPEI FRUIT AND VEGETABLE WHOLESALE MARKET

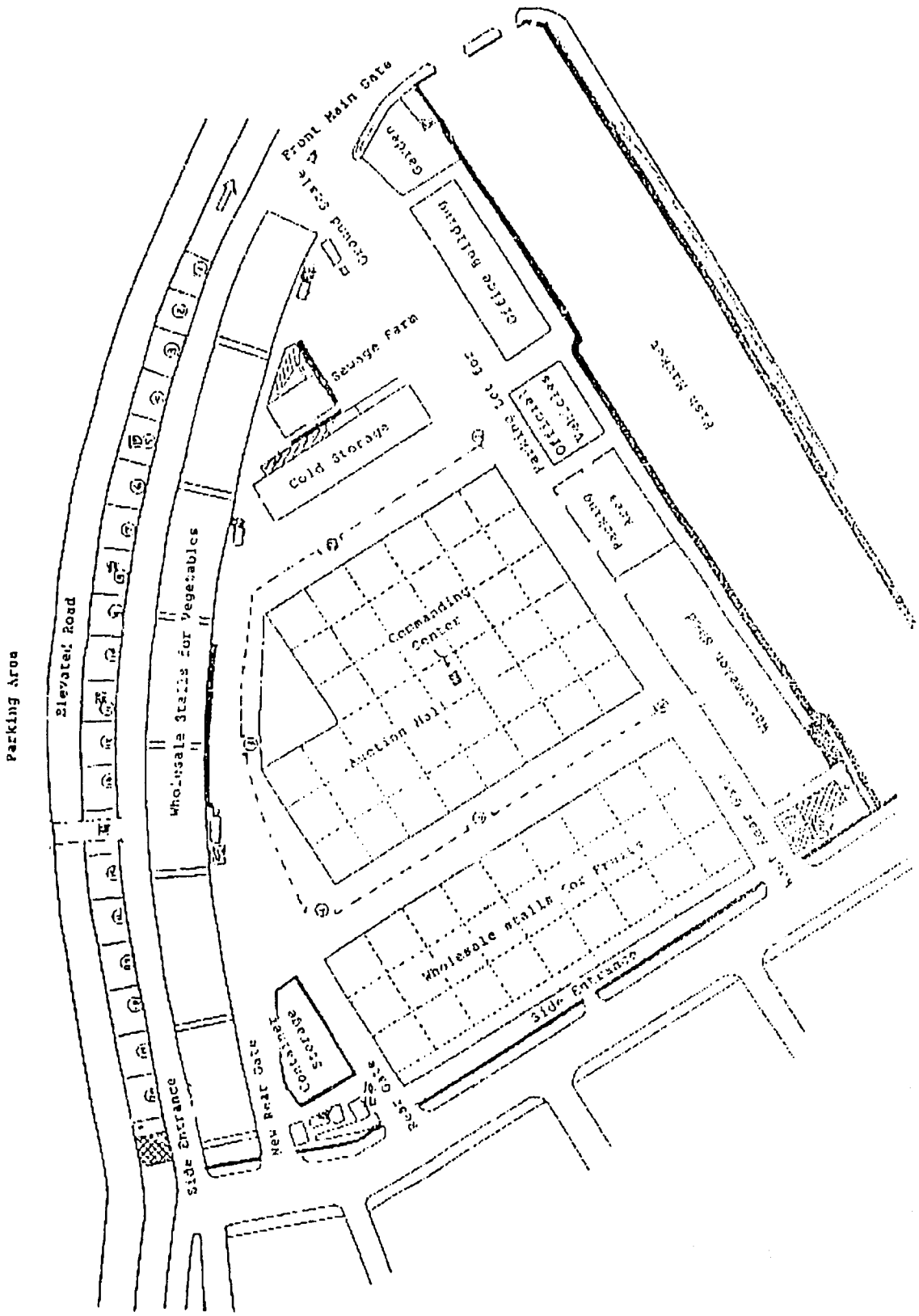
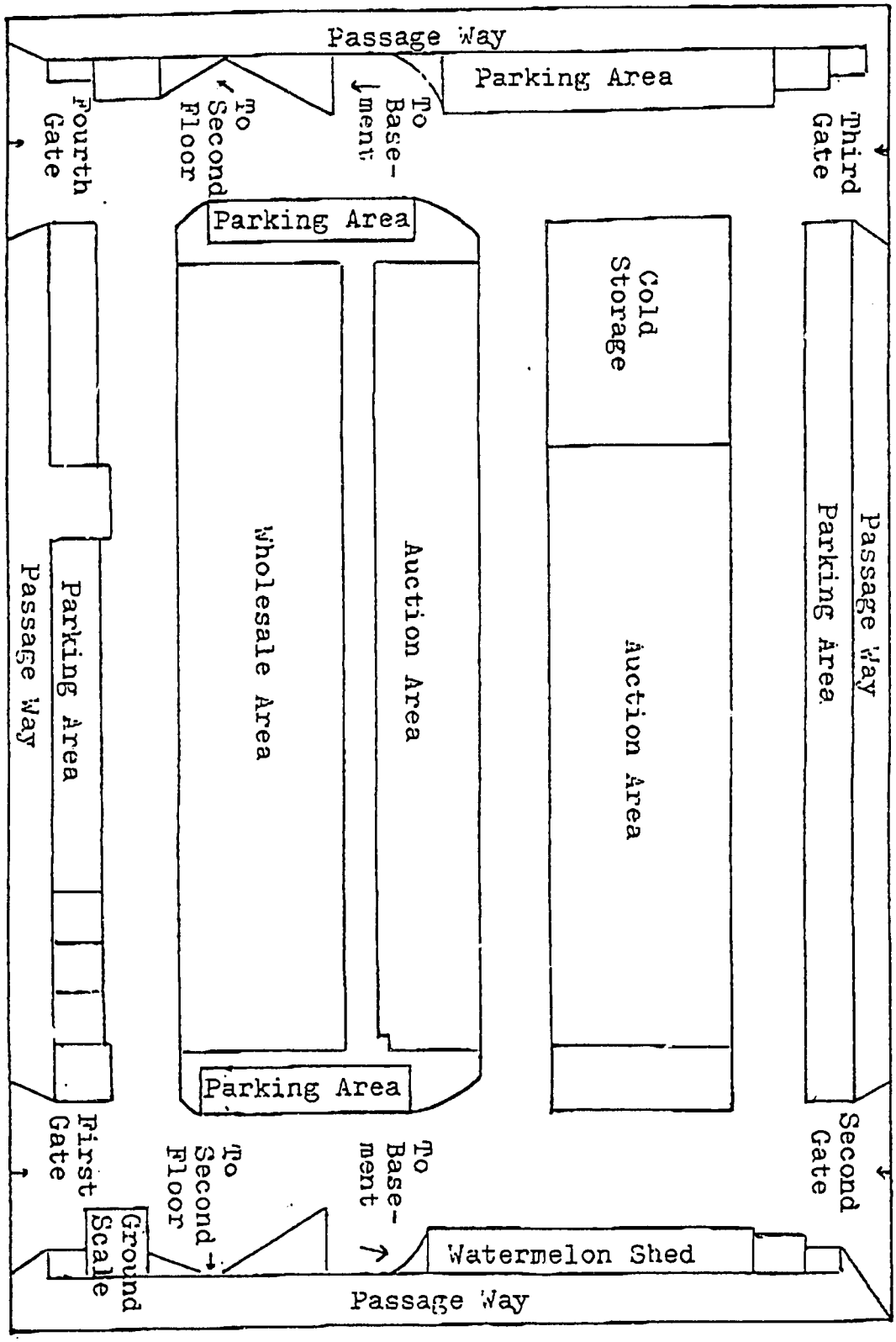


FIGURE 3

GROUND PLAN FOR THE SECOND WHOLESALE MARKET



MARKETERS

The major participants in the Taipei fruit and vegetable wholesale markets are licensed wholesale buyers who are classified as Type I, II, III, and IV traders based on their daily trading volume. Type I traders have the largest trading volume, Type II the next largest, and so on. Each licensed trader has to be one of the following: retailer, jobber, shipper, exporter, processor, or institutional consumer (for example, a restaurant). Most of these buyers are inheritors of family businesses in fresh fruit or vegetable wholesaling who relocated from the Taipei Central Market two decades ago. Types of licensed fruit and vegetable traders in the first market of Taipei in 1994 are shown in Table 6.

Individual produce growers, shippers, or farmer cooperatives can register as suppliers with the market management. Suppliers do not have to sell every day in the auction held in the marketplace. The markets prohibit anyone from holding dual status of supplier and wholesaler in the same marketplace.

To validate their status, licensed traders are required to make a guarantee deposit, the amount of which differs by trader type. All traders are assessed a fee equal to 1.5 percent of the value of each transaction by market management; that is, a 3 percent assessment is evenly shared by the supplier and the buyer for any given transaction.

The second market, located in downtown Taipei, has less building space and handles a much smaller volume of transactions than the first. Because most of its buyers have small-scale businesses, especially in fruits, licensed traders in the second market are all in one class, Type I. Currently, there are only 97 fruit and 115 vegetable wholesalers in the second market.

Market traders commonly specialize in a few commodities or in a group of commodities, in provisioning certain types of buyer (restaurants, hotels, cargo ships), or in different market services. Because most of the vegetables and fruits traded in the marketplace are grown domestically, only a few traders specialize in imported fruits.

TABLE 6

NUMBER OF LICENSED TRADERS IN THE TAIPEI
FRUIT AND VEGETABLE WHOLESALE MARKETS, 1994

Type of Trader	Fruits		Vegetables	
	First Market	Second Market	First Market	Second Market
I	63	97	171	115
II	232		223	
III	59		125	
IV	155		525	
Total	509	97	1,044	115

All licensed wholesale buyers in the markets, except Type IV buyers, are allowed to use an assigned market stall space free of charge for unpacking, trimming, and selling the products they buy at the auction. The size of the stall differs by trader type and by commodity type for the fruit market. Table 7 shows the sizes of stalls for Type I, II, and III traders in the first and second markets.

In the first marketplace, stall size is a function of trading volume, except that larger spaces are distributed to fruit traders ahead of vegetable traders. Stall spaces in the second market are uniform but are small compared with spaces assigned to Type I fruit traders in the first wholesale marketplace. The problem is that stall size and distribution of stall space were based on the number of traders and the scale of business in 1994.

TABLE 7

STALL SIZE BY TYPE OF COMMODITY AND TYPE OF TRADER, 1994
(sq. ft.)

Trader Classification	Fruit Stalls		Vegetable Stalls	
	Size in First Market	Size in Second Market	Size in First Market	Size in Second Market
I	180.00	117.84	124.98	117.84
II	132.84		89.28	
III	103.56		64.28	

CHAPTER FIVE

MARKET OPERATIONS NEEDS

TAPMC is responsible for managing the two wholesale marketplaces in Taipei. The corporation's organization chart (Figure 4) shows its personnel, finances, management, planning, and business operations departments.

COMMODITY ARRIVALS

Near the end of each month, market staff assemble representatives from farmers' associations, farmers' cooperatives, and commercial shippers to decide allotments of the major 21 fruits and 25-30 vegetables for delivery to the market each day during the following month. The representatives will in turn allocate a quota to each of their shipping units for making deliveries. The actual shipment may not coincide exactly with the planned allotment. If producers undersupply, their allotments for the next month may be reduced, and if they oversupply, the excess supply will be withheld for later auction. By scheduling arrivals to match market demand, the market staff tries to stabilize market prices. This arrangement does not apply to imports.

At 5:30 p.m. every day, more than 400 trucks begin a steady procession through this market. In 1993, the annual arrivals were 372,320 metric tons of vegetables and 250,722 metric tons of fruits, a total of 623,042 metric tons. The average arrivals were approximately 1,800 metric tons per day for the 330 annual business days. Arriving trucks are weighed on a large ground scale positioned at the main entrance. The trucks then go to the spots on the auction hall assigned by the weighing station staff to unload. After unloading the trucks, market staff check the goods, count the packing units, and weigh a sample of the commodity. Admission of trucks to the market is completed by 3:30 a.m.

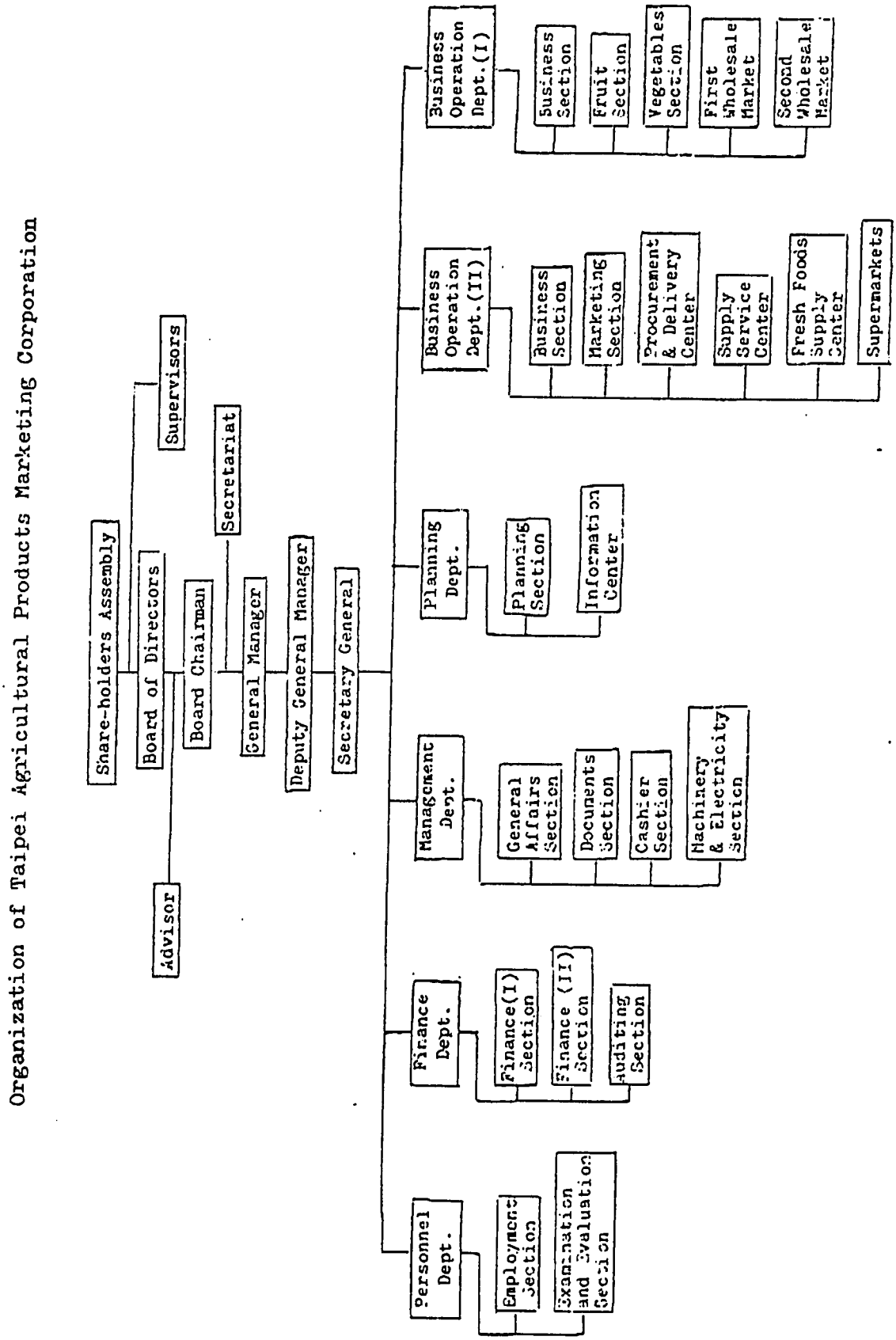
AUCTIONS AND PAYMENTS

The auction begins at 3:30 a.m. every day. Taking into consideration the quality and quantity of newly arrived commodities, weather conditions, prices from the previous day, and other factors, auction staff set the opening price to start the auction. Participating wholesalers inspect the commodity displayed on the floor of the auction hall before starting the auction.

After the commodity is auctioned, it is moved from the auction hall to the wholesaler's stall using hand-pulled or electric carts owned by the trade union organized in the market. The charge is NT$5-NT$7 (US$0.19-0.26 at 1993 rate) per pack, depending on the size of the packs. The wholesaler then resells the commodity to the retailers through direct price negotiation. The auction is normally finished by 6:30 a.m.

FIGURE 4

ORGANIZATION OF TAIPEI AGRICULTURAL PRODUCTS MARKETING CORPORATION



After deducting 1.5 percent in market fees, market staff remit to suppliers proceeds from purchases by wholesalers. Suppliers receive these proceeds no later than the morning after the transaction. Wholesalers are required to pay the sale proceeds (plus 1.5 percent market fee) to market staff within three days of the transaction. To guarantee payment, buyers maintain deposits at the market. At present, the deposit is NT$40,000 (US$1,502) per unit for fruits and NT$20,000 (US$751) per unit for vegetables. If a wholesaler's daily volume of transactions is low, one unit of deposit is sufficient. However, if the daily volume of transaction is high, the wholesaler has to put up two or even three units of deposits — from NT$80,000 (US$3,004) to NT$120,000 (US$4,506) — to guarantee payment.

PESTICIDE RESIDUE TESTING

After all arrivals are placed on the auction floor, chemical residue specialists employed by the market draw samples from the displayed commodities for residue testing. The sampling is purposeful, not random. The specialists draw about 70 samples every day, mostly from vegetables considered most susceptible to residue contamination (this includes leafy vegetables shipped from producing areas that have failed previous residue tests). Because test results must be obtained before the commodity is removed from the auction floor after transaction, specialists use the Rapid Bioassay of Pesticide Residues (RBPR) technique, which can give results in 20 minutes.

If the inhibition ratio from RBPR testing is lower than 25 percent, the sample is considered within the allowable limit. If it is between 25 and 49 percent, a warning will be sent to the original shipper or producer with a request for improvements. If the ratio is 50 percent or greater, the residue is considered excessive, and the whole lot from which the sample was drawn is withheld and banned from transaction. The sample then is turned over to the health bureau of the municipal government for precise chemical analysis.

If the chemical analysis does not show excessive pesticide residue, the shipper or producer whose shipment was banned from transaction will be compensated for the value of the commodity in question. If the final result of the chemical analysis shows excessive pesticide residue, the whole lot from which the sample was drawn and withheld from transaction is destroyed without compensation. The original shipper or producer of the commodity faces prosecution by the competent authority, according to food hygiene laws.

Legally, food safety is primarily the responsibility of the government health authority, not that of TAPMC. What TAPMC can do is detect suspicious commodities shipped to the market and send the suspicious samples to the health authority to determine if the samples contain excessive pesticide residue. If they do, the shipper or producer may be punished accordingly by the government, not by TAPMC. The market's position is to help the government safeguard consumers of fruits and vegetables that pass through the marketing channel.

Independently from TAPMC, the retail market, or retail stores, the Municipal Health Bureau also draws samples to conduct chemical analysis to safeguard the consumers. A consumers' group called the Consumers Foundation also occasionally checks samples of perishables for pesticide residue content and makes public its findings. Because the Consumer's Foundation does not have legal power to punish any one, it relies on the mass media to pressure the competent government authority to strengthen related measures. Because of limited resources, neither the government nor the Consumer's

Foundation can do much pesticide residue testing. TAPMC plays a much more important role in this regard in the wholesale market.

The final results of the pesticide residue testing are presented in Table 8. This table shows that in 1993 alone, the wholesale market conducted pesticide residue testing on 20,029 samples. Between 1987 and 1993, more than 99 percent of the samples tested showed an inhibition ratio of less than 24 percent, which is considered to be within the limit allowed for pesticide residue contents. Between 1988 and 1993, 42 lots (178 packages) were withheld by the market for final chemical analysis by the municipal health bureau. The final result: 38 lots contained excessive pesticide residues and were destroyed without compensation; the original shippers were prosecuted by the health authority for violating food hygiene laws.

TABLE 8

RESULTS OF PESTICIDE RESIDUE TESTING IN TAIPEI FRUIT AND VEGETABLE WHOLESALE MARKETS

Year	Number of Samples Drawn	Inhibition Ratio 0-24%		Inhibition Ratio 25-49%		Inhibition Ratio over 50%	
		Number of Samples	%	Number of Samples	%	Number of Sample	%
1987	3,293	3,255	98.67	36	1.26	2	0.07
1988	11,311	11,270	99.64	30	0.26	11	0.10
1989	13,125	13,094	99.77	28	0.21	3	0.02
1990	13,766	13,709	99.59	50	0.36	7	0.05
1991	13,669	13,609	99.56	55	0.40	5	0.04
1992	14,853	14,749	99.30	96	0.65	8	0.05
1993	20,029	19,920	99.46	101	0.50	8	0.04
Total	90,046	89,606	99.51	396	0.44	44	0.05

Source: Unpublished record of the Taipei Agricultural Products Marketing Corporation.

MARKET TRANSPORT

Three kinds of transportation are involved in the flow of commodities into, at, and out of the wholesale market. First, incoming commodities are hauled by trucks hired by the shipper or the farmer's organization. Second, commodities are moved from the auction floor to the wholesalers' stalls by hand-pulled carts or motorized carts owned by carriers working in the market. These carts can be used only within the market compound. Third, commodities are shipped from the wholesalers' stalls to the retail stores by small pick-up trucks owned or hired by retailers. Parking for retailers is available either inside or outside the market.

The retailers ship their fruits and vegetables back to the retail markets in small trucks carrying about 1,000 kilograms each. Because their purchases are usually less than 200 kilograms, several retailers from the same retail market may jointly hire a pick-up truck and share the transportation costs.

CLEANING OPERATIONS

The job of cleaning the markets every day is awarded to a specialized company by open tender. The market spends about NT$13 million (US$488,722 at 1993 rate) a year for cleaning. The cleaning firm transports market wastes including vegetable leaves, damaged produce, packing materials, and broken crates and baskets to the public land fills developed by the municipality for treatment. All expenses are paid by the market out of its income from market fees. Valued at nearly a half million U.S. dollars a year, sanitary maintenance constitutes a heavy financial burden to the market.

SUPPORT FACILITIES

The Taipei Third Credit Cooperative maintains one office in the headquarters of the market to provide banking services to the shippers, wholesalers, retailers, market management, and market workers. The markets also provide office space to the farmers' associations, marketing cooperatives, the Wholesalers' Association for Fruits and Vegetables, and the union of the workers in the market.

In shipping fruits and vegetables to the market, shippers usually pack the commodity in one-way containers, such as paper cartons. These containers are sold to the wholesaler together with the goods contained. However, if returnable containers, made of plastic crates or bamboo, are used, the market is responsible for recovering empty containers for the shipper. The shipper, however, has the sole responsibility of procuring and paying for the original container of whatever type.

The market also provides traders with support facilities, such as lighting, water, refrigerators, public telephones, and fire hydrants. Each fruit or vegetable wholesale stall user has to share the water bill for the entire wholesale area, prorated based on the size of the stall. Prior to 1993, the electricity payment was similarly shared by all stall users. However, now the electricity bill is paid by individual stall users based on each stall's electricity meter reading.

Market traders are able to rent refrigerator space from the market. However, each trader may rent only 17.85 square feet because of limited market space. Although the market does not furnish telephone lines to individual stalls, almost every stall user has installed a telephone line for business and personal uses.

MARKET INFORMATION

Daily summaries of trading of fresh fruits and vegetables in the first and second markets are compiled by the market information service office. Summaries are distributed to growers, shippers, wholesalers, and retailers every day, as well as to governmental, educational, and research institutions.

Recently, an electronic display board was installed in each auction area. Traders on the auction floor are able to update their information on market activities regularly each day. These information boards are capable of displaying the trading information of both the first and the second markets simultaneously through the wholesale market computer network system.

Most traders in the Taipei wholesale markets are consistently using daily market trading information. Wholesalers commonly set and adjust daily sale prices based on market-released data at the aggregate level and on trading of the previous day. Daily information on market transaction volumes and prices is also helpful to wholesalers in determining the quantity to purchase the next day.

An on-line information inquiry system is being designed by the market information service office. Soon growers, shippers, and other marketing participants outside the marketplace will be able to call in for trading information at any time of day and as often as they like.

CHAPTER SIX

ASSESSING MARKET PERFORMANCE

The previous sections describe the setting of the Taipei wholesale markets and the current situation of their facilities and operations. These sections also show that an important motivating force behind these marketing improvements comes from influential governmental agricultural agencies dedicated to improving the livelihood of farmers. This chapter explores the performance of these urban market facilities from several perspectives — those of market managers and traders. Drawing on the foregoing analysis, this section identifies some key lessons learned in developing effective wholesale markets.

MARKETING SYSTEM PERSPECTIVE

The success in establishing wholesale markets for fruits and vegetables in Taipei has been significant in the improvement of agricultural marketing process in Taiwan. Implications for the marketing system include the following:

- Elimination of centuries-old practices that persisted to protect the interests or bargaining position of suppliers or producers. The unfair practices found in the old Central Market included high commission charges, under-reporting of arrivals and transaction prices, over-reporting of damage and shrinkage, delayed or delinquent payment of sales proceeds, and so forth. All these were eliminated in the new market.

- Concentration of transactions that enhance the role of the wholesale market in price formation. In the last year of the old market, 1973, the total volume of vegetables transacted was 143,807 metric tons, and in 1975, the first full year of operation of the new market, transaction volume increased to 389,000 metric tons, of which 221,190 metric tons were vegetables. The vegetables sold in the new market increased by 54 percent over the last year of the old market. In 1993, vegetables sold in this market further increased to 311,515 metric tons, accounting for a net increase of 117 percent from the old market (Tables 1 and 2). The more concentrated wholesale transactions of fruits and vegetables make the market more reflective of urban demand and supply. Because fruits formerly were sold outside the wholesale market, no statistics were kept on volume and price of transactions in the old Central Market).

- Development of cooperative marketing by the Organization of Fruit and Vegetable Growers. In the old Central Market, there were no jobber-accepted consignments of produce from any growers' organization. The cooperative supply of fruits and vegetables to Taipei was initiated by farmers' associations and fruit marketing cooperatives in the new market. In the first year of operation, the new market received only 9.5 percent of its vegetables and about 4.0 percent of its fruit supply from cooperative marketing. In 1993, the share of cooperative marketing increased to 53.0 percent for vegetables and 47.0 percent for fruits, respectively. This increase indicates that the growers were able to establish direct contacts with the terminal market to get more precise market signals without lag time or distortion of quality.

- Improvements in grading and packing. TAPMC provides financial and technical assistance to farmers' shipping associations and cooperatives in conducting proper grading and employing improved packing at the shipping point. Based on the condition of commodities on arrival, market staff produced publications and help group meetings in rural villages to teach growers how to improve grading and packing. The market subsidized the incremental expenses in adopting more efficient packing containers, such as paper cartons and smaller size packing easier to handle in transit. These have been effective means to enhance the market value of fruits and vegetables marketed.

- Establishment of an open auction system. Although most wholesale markets for agricultural products in Taiwan still employ direct negotiation by the seller and buyer to settle the price, transparency in transaction is by no means attained by this method of transaction. Since its inauguration, the new market has adopted the auction method to maintain openness and competitiveness in the transaction process. The auction system has resulted in fair settled prices agreeable to both parties concerned.

- Maintenance of a special area for exclusive use by suburban farmers to sell their produce directly. The vegetables produced in areas just outside of Taipei are quite different from those produced in far away areas. The produce is mostly leafy vegetables, quick to deteriorate and bulky to handle. The volume of each transaction is quite small and the variety is numerous. A special area in the market, set aside for the exclusive use by suburban growers to sell their produce directly, is very helpful in solving the marketing problems of these farmers.

- Generation of precise market information based on actual transactions. The Taipei markets handle more than 50,000 arrivals every day. All records of transactions are keyed into the computer. Processing of these data is completed by noon, and the resulting statistics are announced to the public immediately on display boards at the markets and through radio and television broadcasting. In markets that rely on direct price negotiation, the price and quantity data are at best obtained from a small sample. In some cases, the estimates are outcomes of knowledgeable guesses. The information from Taipei market is thus much more reliable.

FACILITY MANAGEMENT PERSPECTIVE

The company that manages the wholesale market, TAPMC, is a business enterprise with investment from government and private sources. In addition to managing wholesale market facilities, TAPMC undertakes activities designed to strengthen farmers' marketing practices and to expedite technology transfer. TAPMC also is involved in the establishment, management, and expansion of supermarkets with special sales prices.

As a business entity, TAPMC must show financially healthy performance to survive and grow. The financial statement of TAPMC between 1975 and 1993 is presented in Table 9. Since 1975, the corporation's income and expenditures have grown steadily. The yearly profit, although volatile, is always positive. The corporation has never encountered any loss in business operations. Although the Japanese and Korean counterpart wholesale markets collect 8.5 percent on vegetable sales and 7.0 percent on

proceeds from fruit sales, TAPMC collects only 3.0 percent on both transactions. With a much lower rate of fee collection, TAPMC has achieved sound financial performance.

TABLE 9

INCOME AND EXPENDITURES OF
TAIPEI AGRICULTURAL PRODUCTS MARKETING CORPORATION, 1975-1993
(Unit: US$1,000)

Year	Income (1)	Expenditures (2)	Balance (1)-(2)	Exchange Rates (NT/US$)
1975	2,625	2,349	276	38.00
1976	3,205	4,749	456	38.00
1977	4,738	4,110	628	38.00
1978	5,299	4,660	639	36.00
1979	6,578	5,835	743	36.03
1980	8,780	8,084	696	36.01
1981	15,836	15,003	833	37.84
1982	12,547	11,792	755	39.91
1983	13,889	12,764	1,125	40.27
1984	14,929	14,069	860	39.47
1985	19,894	19,148	746	39.85
1986	44,429	43,046	1,383	35.50
1987	74,994	73,512	1,482	28.55
1988	85,507	84,685	822	28.17
1989	97,875	97,062	813	26.17
1990	107,270	105,560	1,710	27.11
1991	122,533	121,247	1,286	25.75
1992	123,185	121,874	1,311	25.40
1993	120,072	119,826	246	26.63

Source: Unpublished record of Taipei Agricultural Products Marketing Corporation.

TAPMC has been able to return a 10 percent dividend to shareholders every year since its inauguration, far exceeding average corporate performance in Taiwan.

TRADING COMMUNITY PERSPECTIVE

The suppliers of the market, both growers' organizations and individual businesses, often complain about the relatively low price they receive for the commodities they deliver to the market. However, the open and centralized transactions in the market make them believe that the settled price is reasonable. Each group of suppliers is pressing the market to allocate larger quotas for its members to ship to the market, although the market cannot accommodate the larger quotas. Still, willingness to supply more indicates that the suppliers have confidence in the market.

The buyers and wholesalers in the market have something to say regarding market operations. Their requests include larger stall spaces for bigger business, larger cold storage spaces for more storage operations, self-transport of the purchased commodity from auction floor to wholesale stalls, better handling of the goods in transit, and guarantee of weight and quality of the commodity supplied by the market. The willingness of buyers and wholesalers to continue or expand business in the market instead of seeking opportunities outside the market indicates they think improvements are possible, not that they are completely satisfied.

FACILITIES

As Taipei and adjacent cities grew, the population increased many fold in the last 20 years. Taipei's fruit and vegetable wholesale markets have been carrying on the wholesaling and jobbing for many times the number of people it originally was intended to serve. The volume and variety of products the Taipei wholesale markets handled have increased tremendously since they were first built. As a result, market facilities have become overcrowded. At present, the two markets handle a daily average of nearly 2,000 metric tons, about three times the ideal capacity the market originally was designed to handle.

For a long time, insufficient capacity has been a severe problem associated with the wholesale markets. Physical facilities of the first and second markets, such as auction buildings, assembly and jobbing areas, parking lots, as well as paths within and surrounding the markets, are all in extreme need of expansion. Structures of the fan-shaped auction building in the first market are too old to meet the requirement of public safety. Thus, to repair or to reconstruct these dangerous buildings is the greatest need.

In addition to the major needs of structural repairs, many market facilities need to be improved. For instance, the drainage system of the second market has to be reconstructed so that the problems of grounds flooding can be treated effectively. And, additional weighing scales within the marketplace will be more convenient to traders for reweighing their merchandise bought from auction.

Although both TAPMC and merchants at the marketplace continuously put in a claim for wholesale market structural repairs to the city government of Taipei, none of the necessary repairs or improvement plan have been finalized yet. Most of the market traders interviewed believe that the major barrier to improving market facilities is not finances but the disputes on government policies. Opinions of policy makers differed as to what should be done to improve the markets' operations. Some insist that the markets should be moved to a location with bigger land so that better market facilities can be provided. Others believe that to rebuild the entire market facilities on the present site would be much

easier than to relocate the market again. According to the survey on the development of the first Taipei fruit and vegetable wholesale market conducted by the market administration of the Taipei, the proposition that reconstruction of the market building at the present site has been supported by the majority of the people responded, including market employees, government officials, and agricultural economists.

MANAGEMENT ARRANGEMENTS

According to the market traders surveyed, marketing operations by TAPMC need to be improved in many aspects. Only the five most-desired improvements are mentioned here.

First, it is often found that produce suppliers cheat by adding stuffing in containers to make them appear heavier than they are or by hiding lower-grade products at the bottom of the container. The result is that the actual weight of products is less than that shown on the container label and the value of merchandise, thus, is lower than claimed. Despite suppliers having recently been required to put down products' net weight on each of the containers they packed, the weight shortage problem still exists in the marketplace. Many auction buyers would like to see more severe sanctions, such as posting names of violators on market bulletin boards across the trading floor or suspending suppliers' licenses, to be imposed on frequent cheaters.

Second, wholesalers in the marketplace are prohibited from self-transporting merchandise between auction floors and assembly stalls. Only registered delivery workers of TAPMC are allowed to do so. Behavior such as refusing to deliver a few pieces, stealing products during delivery, inflating per piece charge, or serving only some particular customers occurs quite often. Many traders, especially those who handle vegetables, have complained about the poor job the market delivery workers have done. Because most of the market traders are qualified produce packers as well as deliverers, they would like to have the privilege to self-deliver within the marketplace.

Third, some wholesalers and retailers keep occupying market parking space for cleaning and repackaging the products they just purchased from the trading floor. Such behavior makes the already crowded parking lots more crowded and the jammed traffic even worse. Illegal usage of market parking spaces should be eliminated either by fining violators or by effective management methods.

Fourth, the Taipei fruit and vegetable wholesale markets close only one day every two weeks since it first opened. The market traders would like to get more time off, for example, to close trading one day per week, as the result of traders' increasing concern for their leisure time.

Fifth, many fruit wholesalers in the marketplace are against issuing licenses to new Type IV traders, because their businesses today are so much affected by the increasing number of Type IV traders. These small fruit buyers do not compete with fruit wholesalers directly within the marketplace, because they have no stall spaces to sell their commodities there. However, most of the Type IV traders are sidewalk vendors. They have not only greater mobility but also selling costs lower than those who operate under fixed stall spaces inside the marketplace.

IMPROVEMENTS ENVISIONED

For the past 20 years, the Taipei fruit and vegetable wholesale markets not only served the function of matching producer supplies with Taipei consumer demands but also performed several other functions such as receiving, storing, and forwarding physical distribution of produce. The convenient location and prosperous auction trading atmosphere have encouraged many produce marketers to continuously do business at the marketplace. In addition, market information on wholesale volumes and prices was employed extensively by producers, marketing agents, policy makers, as well as agricultural marketing researchers as the basis for marketing decisions or policy considerations.

Since their establishment, the Taipei fruit and vegetable wholesale markets have been operated by TAPMC, a nonprofit business organization with the primary goal of pursuing orderly marketing for fresh fruits and vegetables. Over the years, TAPMC made quite an effort to improve the efficiency of produce marketing. Today, nearly 50 percent of the total quantities of fruits and vegetables consumed in the Taipei metropolitan area are marketed through the wholesale markets. And the growth of farmer cooperative marketing in the Taipei fruit and vegetable wholesale markets has outpaced any other fruit and vegetable wholesale market in Taiwan.

Regardless of all the accomplishments made by TAPMC, there were indications that the physical facilities of the Taipei markets had become congested and obsolete. Because no prompt improvement action or advanced planning project was taken to solve the limited capacity problem by the property owner, more and more facility shortage and inefficient operation problems were induced and accumulated afterward. Moreover, because most problems occurring in the marketplace are highly interrelated, it is a complicated and difficult task to isolate either one from the other. Hence, the essential need for improving market efficiency is to expand the physical size of the Taipei fruit and vegetable wholesale markets.

Besides operating the Taipei fruit and vegetable wholesale markets, TAPMC also runs a supermarket chain, which is an integrated wholesale-retail system characterized by selling produce with lower-than-average retailing prices. Merchants at the wholesale marketplace have felt not only the increasing competition in produce business but also the retrogression of the market's managerial services as TAPMC has lately put more emphasis on operating its supermarket chain.

Reassignment of wholesalers' stall spaces takes place every three years. Each user of market stall space is subject to market management regulations, under which any space renting and/or sharing is prohibited. The market will take a stall back as its assigned user is unable to continue his business due to age, sickness, or death. However, the market stall space is inheritable by the spouse or one of the relatives or business assistants of the original trader as long as that person qualifies to trade in the marketplace.

Although the location of each trader's stall space in the assembly area is assigned by TAPMC, swapping for the sites of stalls among stall users is allowed if an agreement between the two parties involved is reached. Details of these agreements are usually unknown to others. It is necessary for site swappers to file a request to the market management for changing the records of their stall sites in order to ensure their business rights.

According to those market traders interviewed, insufficient stall space has been the major problem in the marketplaces. Some think that to reassign stall space every three years is very inconvenient to their

business. They would like to have a permanent stall site to do business in the marketplace. In addition, better business opportunity seems to be highly associated with those stalls located near the entrances of the assembly and wholesaling building.

In terms of the performance of the support facilities, most fruit and vegetable traders have complained about the restriction on renting the refrigerating space from the market, which has restrained them from operating a more flexible wholesaling business. Because water faucets are located along the sides of fruit assembly areas, water use is inconvenient for some fruit stall users. They expect the market to connect water pipelines to each fruit stall as soon as possible.

Although the business of selling fresh fruits and vegetables in the wholesale market has stagnated over the years because the increasing competition from supermarkets and giant wholesalers, the majority of the wholesalers in the marketplace who participated in the interview have no intention of seeking better business opportunities in other careers or in other places. In fact, age and long-term business experience in the wholesale marketplace are the two fundamental determinants for them to keep their businesses in the marketplace. Many fruit and vegetable wholesalers who moved into the Taipei markets 20 years ago are approaching retirement age and are used to doing business under the current market environments. Other possible reasons for their reluctance to move include the fear of losing business or incurring higher costs. However, they all felt that business conditions of the Taipei wholesale markets are getting worse for attracting new participants.

Although most hereditary businesses, fresh fruit and vegetable wholesaling, are likely to end in the current generation under the stagnating performance of the Taipei wholesale markets, many traders in the marketplace are optimistic about the prospects for development of these markets.

SYNTHESIS OF LESSONS LEARNED

The basic difficulties encountered in developing wholesale markets for agricultural products are the unavailability of land conveniently located and spacious enough to accommodate the flow of a large volume of perishable products in a short period of time. Land is very expensive in present day Taiwan. The government should consider the market as a kind of infrastructure for a modern big city and make every effort to procure the needed land for market construction.

Because land is a very scarce and costly resource, full use of the already available market space is a future direction for development. At present, wholesale transaction in fruits and vegetables are all done in the early morning. Because most suppliers and buyers specialize in either fruits or vegetables, transactions of vegetables may be done in the early morning, and fruit transactions may be shifted to the afternoon, when vegetables are all moved out of the market. If this system can be established, the transaction volume of the existing market may be doubled without expanding the physical size of the market.

In constructing a new wholesale market, use of a multistory building can be investigated. In the past, the idea of a multistory wholesale establishment was not well accepted by buyers and wholesalers. However, conditions are changing. If arrangements can be made, this idea may help solve some land-acquisition problems.

Problems raised by traders regarding weight shortage or variable quality of product in the same container are very realistic ones. The market management should improve weight and quality inspection of the arrivals before transactions are completed. Promotional and educational programs at the shipping point may also help improve this situation. If disputes on weight and quality are eliminated, the operational efficiencies can be upgraded considerably.

At present, auction is done manually, lot by lot. Mechanical auction and computerized transaction are being studied and experimented. These modern techniques must be accompanied by an increase in lot size, adherence to uniform quality, and an increase in size of units of transaction. Separating the physical flow of products and their commercial transactions — transactions without the presence of the commodity — may be the direction of future development.

CHAPTER SEVEN

RENOVATION AND EXPANSION

The outlook for agricultural marketing system improvements remains uncertain, yet the demand for change is very strong. The following three situations provide insights into the nature and reasons for such changes.

FIRST MARKET (WANTA MARKET)

Growing from an annual throughput of 388,514 metric tons in 1975 to 519,360 metric tons in 1993, and now accommodating the transactions of about 1,600 metric tons of fruits and vegetables daily, the first wholesale market for fruits and vegetables in Taipei is considered saturated. The market is overcrowded by people, commodities, and vehicles during business hours every day. The market's supporting facilities, especially the cold storage, have become obsolete. Promoting operational or managerial efficiency has become a luxury for this market.

During the past several years, relocation of this market has been a topic of hot discussion. There has been a consensus, among those with a technical viewpoint, on the need to move the market to another location or to construct new facilities on the present market site. But failure to find spacious enough to accommodate the necessary business volume has stalled discussion. What the market can do is to expedite transactions through technical innovations — including sample auctions, mechanized auctions, and computerized processing of transaction data. It can also encourage bigger lots, uniform quality, and larger units of sale. Relocation of this market may not be realistic in the near future.

SECOND MARKET (PINCHIANG MARKET)

The second wholesale market was completed in early 1985; trade in fruits and vegetables began in September of that year. Later, the wholesale business of flowers was added to the market. At present, the market features transactions of fruits and vegetables, which are handled by TAPMC as they are in the first market. Flower transactions are handled by the Taipei Flowers Marketing Corporation, an independent private company. The first floor of the three-story market building is used for wholesaling of vegetables and fruits, and the second floor is used for wholesaling of flowers. The third floor is used for offices.

Unfortunately, because of engineering flaws in construction, serious cracks were found in the market structure when the building was completed. It is considered a dangerous building and may collapse if hit by an earthquake of considerable magnitude. Fearing a disastrous accident, the municipal authority is planning to tear down the existing structure and construct a new one on the same site.

As part of the reconstruction plan, a temporary market is under construction on idle land reclaimed from an abandoned river not far from the original market site. The fruit and vegetable market will be moved to the temporary market to continue its business. The flower market will occupy the first floor of the original market, after some reinforcement, whereas the second and third floors of the original

market will be emptied. The flower market will later be moved to the new market to be constructed in the southern district of the city for the exclusive use of flower wholesaling. The original market will then be dismantled and a new market erected in its place. Moving the fruit and vegetable wholesale business in the temporary market to the reconstructed market may take 10 or more years.

FLOWER WHOLESALE MARKET

The 17,000 square meters of land on which the flower wholesale market now stands were designated as a wholesale market site when the city planning of the southern region of Taipei was finalized in 1973. Seeing no urgent need to construct a wholesale market there and lacking the financial means to expropriate the land — that is, to purchase the land compulsorily at lower-than-market price — the municipal government did not take any positive action toward market development. In 1989, the municipal government decided to use this piece of land for the construction of a fruit and vegetable market and started to expropriate the land, which partly belonged to private landlords and partly belonged to the military. Neighborhood residents strongly opposed this plan, and the land acquisition became deadlocked. In the meantime, people in the flower business staged active lobbies to revise the original plan to construct a specialized flower wholesale market instead. The municipal government retreated and agreed to change the original plan and decided to build a flower wholesale market there.

The government spent NT$600 million (US$22.5 million at the 1993 rate) acquiring the land, about 17,000 square meters in area, as land prices to the land owners and compensation to the military. The construction budget of this six-story building market is NT$2.5 billion (US$95.4 million at 1994 rate). The engineering designs are nearly ready, and the municipal authority is expecting to award the construction to a local contractor through open tender. If everything goes as planned, the construction may be completed in 1999, and the new market will be inaugurated in the year 2000. The municipal government will pay close attention to the design and construction of the new market to avoid any more engineering flaws.

BIBLIOGRAPHY
(English Only)

1. *Taiwan Statistical Data Book*, 1994, Council of Economic Planning and Development, Republic of China.

2. *Agricultural Trade Statistics of Republic of China*, 1994, Council of Agriculture, Executive Yuan.

3. *Taiwan Agricultural Yearbook*, 1994 edition, Department of Agriculture and Forestry, Taiwan Provincial Government.

4. *Taiwan Area Agricultural Products Wholesale Market Yearbook*, 1993 edition, Department of Agriculture and Forestry, *Taiwan Provincial Yearbook.*

5. *Taipei Agricultural Products Marketing Corporation Statistical Yearbook*, 1994 edition, Taipei Agricultural Products Marketing Corporation.

6. *Basic Agriculture Statistics, Republic of China*, 1994 edition, Council of Agriculture, Executive Yuan.

7. Taiwan Food Balance Sheet, Council of Agriculture, Executive Yuan.

8. Hsing-yiu Chen: The Marketing of Fruits and Vegetables in Taiwan, Food and Fertilizer Technology Center Extension Bulletin, July 1983.

9. Bai Yung Sung: "Efficiency in Agricultural Wholesale Marketing Activities in Seoul," *Journal of Rural Development*, April 1980.

10. Hsing-yiu Chen: Wholesale Food Markets in Taiwan—Their Organization, Operation and Management, Food and Fertilizer Technology Center Extension Bulletin, November 1980.

11. Hsing-yiu Chen: "Food Price and Marketing Policies in Taiwan," Industry of Free China, October 1980.

12. Hsing-yiu Chen: Agricultural Marketing in Taiwan, 1974, Joint Commission on Rural Reconstruction.

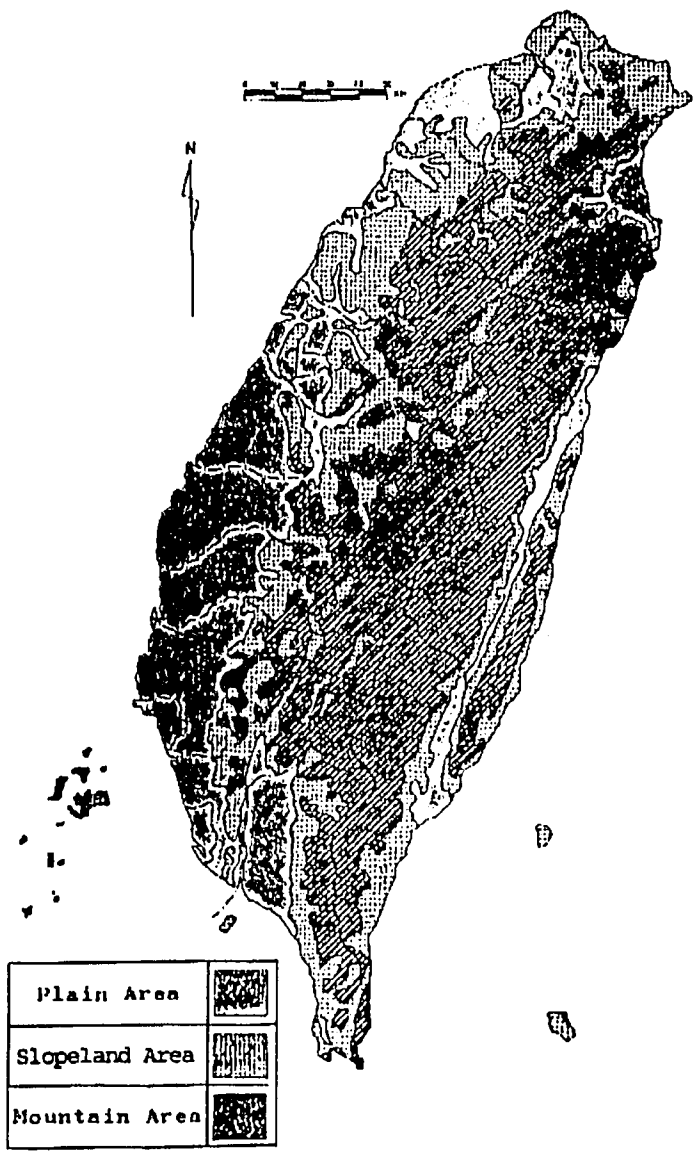
ANNEXES

ANNEX 1. AREA AND GEOGRAPHICAL POSITION OF TAIWAN

Geographical Division	Area (km^2)	No. of Islands	Coastline (km.)	Longitude		Latitude	
				Aspect	Apex	Aspect	Apex
Whole Area	36,000 (13,900 M2)	86	1,566.3	Eastern Point	124°C34'09"	Southern Point	21°C45'25"
				Western Point	119°C18'03"	Northern Point	25°C56'21"
Taiwan Island	35,873	22	1,239.6	Eastern Point	124°C34'09"	Southern Point	21°C45'25"
				Western Point	120°C01'00"	Northern Point	25°C56'21"
Penghu Archipelago	127	64	326.7	Eastern Point	119°C42'54"	Southern Point	23°C09'40"
				Western Point	119°C18'03"	Northern Point	23°C45'41"

* Including reclaimed tidal land.
Source : The Ministry of Interior, R.O.C.

ANNEX 2. MAP OF LAND RESOURCES



ANNEX 3. TRACK LENGTH AND NUMBER OF RAILWAY STATIONS, 1980-1983[1]

End of Year	Total Track Length (km)	Route Length (km)	Number of Stations
1980	2,525.9	1,091.1	256
1981	2,513.8	1,091.2	254
1982	2,512.3	1,075.3	238
1983	2,557.9	1,075.3	238
1984	2,585.7	1,075.3	238
1985	2,630.6	1,082.0	236
1986	2,648.5	1,082.0	234
1987	2,646.4	1,082.0	234
1988	2,634.8	1,071.5	225
1989	2,634.8	1,071.5	221
1990	2,634.8	1,062.4	219
1991	2,634.8	1,045.3	211
1992	2,789.4	1,107.7	219
1993	2,779.8	1,107.7	220

[1] Figures refer to railways of Taiwan Railway Administration only.
Source: Ministry of Transportation and Communications, R.O.C.

ANNEX 4. LENGTH OF HIGHWAYS, 1980-1993
(Unit: km.)

End of Year	Total	Paved Roads	Gravel Roads	Dirt Roads
1980	16,931.4	11,994.3	3,772.9	1,164.2
1981	16,965.5	12,186.7	3,654.1	1,124.7
1982	17,015.4	12,393.4	3,544.4	1,077.6
1983	19,279.5	15,958.8	2,722.7	598.0
1984	19,305.5	15,993.8	2,710.4	601.3
1985	19,294.5	16,039.4	2,638.2	616.9
1986	19,322.6	16,218.5	2,516.0	588.1
1987	19,382.6	16,321.5	2,479.2	281.9
1988	19,418.6	16,473.0	2,370.9	574.7
1989	19,435.1	16,616.0	2,248.6	570.5
1990	19,479.0	16,734.1	2,176.8	568.1
1991	19,490.2	16,817.9	2,110.9	561.4
1992	19,539.6	16,929.4	2,055.1	555.1
1993	19,531.0	17,022.0	1,961.7	547.3

Source: Ministry of Transportation and Communications, R.O.C.

ANNEX 5. RAILWAY AND HIGHWAY DENSITIES, 1980-1983

End of Year	Meters Per Square Km		Meters Per 1,000 Persons	
	Railway (1)	Highway (2)	Railway (1)	Highway (2)
1980	70	470	142	948
1981	70	471	139	932
1982	70	473	136	919
1983	71	536	137	1,029
1984	72	536	136	1,015
1985	73	536	137	1,002
1986	74	537	136	993
1987	74	538	135	985
1988	73	539	132	977
1989	73	540	131	967
1990	73	541	129	957
199i	73	541	128	948
1992	77	543	134	942
1993	77	543	132	930

Source: Ministry of Transportation and Communications, Ministry of Interior, R.O.C.

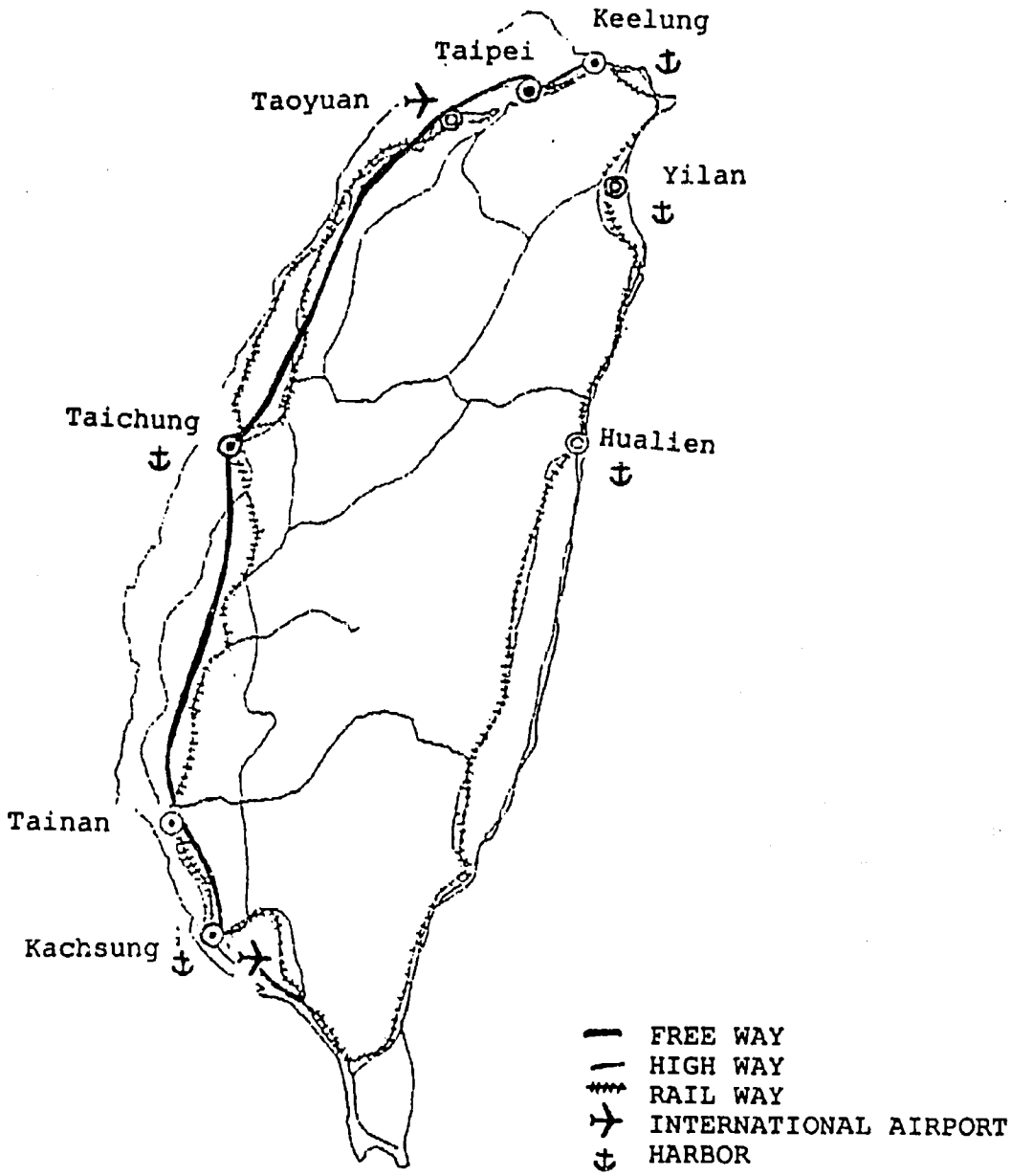
ANNEX 6. FREIGHT HANDLED AT HARBORS, 1980-1993

(Unit: 1,000)

Period	Loading and Unloading					
	Grand Total	Keelung Harbor	Kaohsiung Harbor	Hwalien Harbor	Taichung Harbor	Suao Harbor
1980	116,450	35,186	71,850	3,398	4,747	1,269
1981	121,186	33,616	76,168	3,683	5,888	2,831
1982	122,584	33,282	76,610	4,166	6,599	1,927
1983	150,771	41,942	93,995	4,406	7,551	2,877
1984	181,453	53,487	113,274	3,756	7,684	3,252
1985	183,910	49,936	118,572	3,902	7,917	3,583
1986	227,489	66,173	143,747	4,608	9,472	3,489
1987	260,519	79,851	160,510	4,494	11,912	3,751
1988	283,193	76,592	181,729	5,404	14,923	4,544
1989	196,309	78,296	191,043	5,597	16,982	4,392
1990	301,062	79,615	190,945	5,172	21,261	4,069
1991	332,000	86,970	207,448	5,884	27,547	4,150
1992	345,278	86,267	214,198	6,316	34,672	4,825
1993	383,723	86,396	243,609	8,076	39,940	5,702

Source: Ministry of Transportation and Communications.

ANNEX 7. TRANSPORTATION MAP OF TAIWAN



ANNEX 8. NUMBER OF TELEPHONE SUBSCRIBERS PER 100 PERSONS IN SELECTED CITIES
(Unit: Subscribers /100 Persons)

End of Year	Taiwan Area	Taipei	Kaohsiung	Taichung	Tainan	Keelung
1980	13.00	27.58	19.27	22.49	18.78	16.37
1981	15.49	29.85	22.15	25.57	21.51	18.50
1982	17.44	31.47	24.64	27.69	23.54	20.63
1983	19.25	33.07	25.34	29.92	26.34	21.70
1984	20.70	34.49	26.57	31.88	28.43	22.74
1985	21.89	35.82	27.73	33.35	29.94	23.55
1986	23.27	37.33	28.85	35.36	32.18	24.57
1987	24.89	39.46	30.47	37.76	34.64	25.72
1988	26.72	42.21	32.60	41.91	37.71	27.14
1989	28.89	43.90	35.26	46.07	40.72	28.83
1990	30.88	48.50	37.57	49.95	43.85	30.19
1991	33.26	52.47	40.09	55.21	47.86	32.09
1992	35.66	56.49	42.76	60.06	52.18	33.97
1993	37.8 '	59.65	45.59	57.93	56.32	35.76

Source: Ministry of Transportation and Communications.

ANNEX 9. POPULATION SIZE AND GROWTH RATE BY GENDER, 1980-1993

End of Year	Number* (1,000 persons)			Growth Rate (%)		
	Total	Male	Female	Total	Male	Female
1980	17,805	9,288	8,517	1.9	1.8	2.0
1981	18,136	9,449	8,687	1.9	1.7	2.0
1982	18,457	9,606	8,852	1.8	1.7	1.9
1983	18,733	9,740	8,993	1.5	1.4	1.6
1984	19,013	9,875	9,137	1.5	1.4	1.6
1985	19,258	9,994	9,264	1.3	1.2	1.4
1986	19,455	10,087	9,368	1.0	0.9	1.1
1987	19,673	10,190	9,483	1.1	1.0	1.2
1988	19,904	10,302	9,602	1.2	1.1	1.3
1989	20,107	10,398	9,709	1.0	0.9	1.1
1990	20,353	10,516	9,837	1.2	1.1	1.3
1991	20,557	10,615	9,942	1.0	0.9	1.1
1992	20,752	10,708	10,044	1.0	0.9	1.0
1993	20,944	10,797	10,147	0.9	0.8	1.0

* Excluding servicemen and foreign nationals.
Source: *Taiwan Statistical Data Book*, 1994, Council for Economic Planning and Development, Republic of China.

ANNEX 10. POPULATION DENSITY AND VITAL STATISTICS, 1980-1993

Period	Population Density (1)		Birth		Death		Natural Increase	
	Per Sq. Km.	Per Sq. Km. of Cultivated Land	Number (1,000)	Rate (%)	Number (1,000)	Rate (%)	Number (1,000)	Rate (%)
1980	494.58	1,962.3	413	2.34	84	0.48	329	1.86
1981	503.76	2,015.1	413	2.30	87	0.48	326	1.82
1982	512.62	2,071.6	404	2.21	87	0.48	317	1.73
1983	520.36	2,094.6	382	2.06	91	0.49	291	1.57
1984	527.12	2,132.3	370	1.96	90	0.48	280	1.48
1985	534.95	2,180.7	345	1.80	92	0.48	253	1.32
1986	540.40	2,192.1	308	1.59	95	0.49	213	1.10
1987	546.46	2,219.7	313	1.60	96	0.49	217	1.11
1988	552.88	2,224.0	341	1.72	102	0.51	239	1.21
1989	558.54	2,247.6	315	1.57	103	0.51	212	1.06
1990	565.36	2,286.6	335	1.66	105	0.52	230	1.13
1991	571.02	2,326.6	321	1.57	106	0.52	215	1.05
1992	576.46	2,369.1	321	1.55	110	0.53	211	1.02
1993	581.78	2,394.9	325	1.56	111	0.53	214	1.03

(1). End of year.

Source: *Taiwan Statistical Data Book,* 1994, Council for Economic Planning and Development, Republic of China.

ANNEX 11. POPULATION OF MAJOR CITIES, 1980-1993

Year	Total	Taipei	Kaohsiung	Keelung	Taichung	Tainan
1980	17,866	2,220	1,202	345	593	584
1981	18,194	2,271	1,227	348	607	595
1982	18,516	2,328	1,248	350	622	610
1983	18,733	2,388	1,262	352	636	622
1984	19,013	2,450	1,285	353	655	632
1985	19,258	2,508	1,303	352	675	640
1986	19,455	2,575	1,321	350	696	646
1987	19,673	2,637	1,343	349	715	657
1988	19,904	2,682	1,362	349	730	668
1989	20,107	2,703	1,374	350	747	676
1990	20,401	2,720	1,387	353	762	638
1991	20,558	2,718	1,396	356	774	690
1992	20,752	2,696	1,406	359	795	685
1993	20,944	2,653	1,405	363	817	700

Note: Total number includes population in areas other than five cities listed above.
Source: *Taiwan Agricultural Yearbook*, Department of Agriculture and Forestry, Taiwan Provincial Government.

ANNEX 12. EMPLOYMENT BY INDUSTRY, 1980-1993
(Number: 1,000 persons)

Period	Total	Primary Industry	Secondary Industry					Tertiary Industry			
			Subtotal	Mining	Mfg.	Constr.	Utilities	Subtotal	Comm.	Trans.	Other Services
1980	6,547	1,277	2,784	56	2,152	549	27	2,487	1,058	332	1,098
1981	6,672	1,257	2,828	54	2,162	583	29	2,587	1,106	342	1,139
1982	6,811	1,284	2,813	51	2,168	563	31	2,713	1,168	352	1,194
1983	7,070	1,317	2,909	46	2,282	548	33	2,844	1,231	362	1,251
1984	7,308	1,286	3,089	41	2,497	517	34	2,934	1,281	370	1,283
1985	7,428	1,297	3,088	35	2,501	517	34	3,044	1,327	385	1,333
1986	7,733	1,317	3,215	33	2,635	512	34	3,201	1,372	108	1,432
1987	8,022	1,226	3,431	31	2,821	544	35	3,366	1,429	418	1,519
1988	8,107	1,112	3,443	28	2,802	577	35	3,551	1,530	423	1,598
1989	8,258	1,066	3,476	24	2,796	620	35	3,717	1,605	432	1,680
1990	8,283	1,064	3,382	20	2,653	673	36	3,837	1,621	441	1,774
1991	8,439	1,093	3,370	19	2,598	715	37	3,977	1,712	448	1,817
1992	8,632	1,065	3,419	18	2,585	778	37	4,148	1,771	450	1,927
1993	8,745	1,005	3,418	19	2,483	879	36	4,323	1,806	463	2,054

Source: *Taiwan Statistical Data Book*, 1994, Council for Economic Planning and Development, Republic of China.

ANNEX 13. PER CAPITA GROSS NATIONAL PRODUCT, 1980-1993

Period	At Current Prices			At 1986 Prices before Adjustment of Terms of Trade	
	Amount US $	Amount NT $	Nominal Growth Rate of NT $ (%)	Amount NT $	Real Growth Rate (%)
1980	2,344	84,398	22.1	104,612	5.1
1981	2,669	98,179	16.3	108,616	3.8
1982	2,653	103,803	5.7	110,997	2.2
1983	2,823	113,103	9.0	118,655	6.9
1984	3,167	125,496	11.0	130,467	10.0
1985	3,297	131,430	4.7	135,817	4.1
1986	3,993	151,148	15.0	151,148	11.3
1987	5,275	168,114	11.2	167,301	10.7
1988	6,333	181,185	7.8	178,376	6.6
1989	7,512	198,389	9.5	189,697	6.2
1990	7,954	213,888	7.8	196,674	3.9
1991	8,788	235,699	10.2	208,593	6.1
1992	10,202	256,682	8.9	219,001	5.0
1993	10,566	278,821	8.6	229,843	5.0

Source: *Taiwan Statistical Data Book*, 1994.

ANNEX 14. GROSS DOMESTIC PRODUCT BY INDUSTRY, 1980-1993

Unit: Percent (%)

Period	Total	Agricultural	Industry				Services				
			Subtotal	Manufac-turing	Construction	Electricity, Gas, and Water	Subtotal	Commerce	Transport, Storage, and Communi-cations	Govern-ment Services	Finance, Insurance, and Business Services
1980	100.0	7.7	45.7	36.0	6.3	2.5	46.6	13.1	6.0	9.7	12.7
1981	100.0	7.3	45.5	35.6	5.7	3.3	47.2	13.5	6.0	10.4	13.8
1982	100.0	7.7	44.4	35.2	5.0	3.3	47.9	13.6	6.0	11.0	13.7
1983	100.0	7.3	45.0	36.0	4.6	3.7	47.7	13.3	6.0	10.6	13.1
1984	100.0	6.3	46.2	37.6	4.3	3.7	47.5	13.5	6.3	10.2	13.3
1985	100.0	5.8	46.3	37.6	4.1	4.0	47.9	13.8	6.4	10.3	13.8
1986	100.0	5.5	47.6	39.7	3.9	3.6	46.8	14.1	6.2	9.4	13.1
1987	100.0	5.3	47.4	39.5	3.9	3.6	47.3	14.0	6.1	9.1	14.0
1988	100.0	5.0	45.7	37.8	4.3	3.2	49.3	14.3	6.2	9.6	15.7
1989	100.0	4.9	43.6	35.6	4.6	3.0	51.5	14.6	6.2	9.9	17.9
1990	100.0	4.1	42.5	34.4	4.9	2.9	53.4	15.4	6.1	10.9	18.9
1991	100.0	3.7	42.5	34.4	4.9	2.8	53.8	15.8	6.2	11.4	18.8
1992	100.0	3.5	41.4	32.9	5.2	2.9	55.1	16.3	6.3	11.4	19.2
1993	100.0	3.5	40.6	31.6	5.6	2.8	55.9	16.5	6.4	11.2	19.9

Source: *Taiwan Statistical Data Book*, 1994.

ANNEX 15. HOUSEHOLD PROPENSITY TO CONSUME AND TO SAVE, 1980-1993
(Amount Unit: NT$ million)

Period	Household Disposable Income (A)	Household Consump-tion (B)	Household Savings (C)	Average Propensity to Consume (B)/(A)	Average Propensity to Save (C)/(A)	Annual Increase in			Marginal Propensity to Consume (E)/(D)	Marginal Propensity to Save (F)/(D)
						Disposable Income (D)	Consumption (E)	Savings (F)		
1980	938,648	767742	170906	0.82	0.18	179,733	163,269	16,464	0.91	0.09
1981	1,162,404	922,154	240,250	0.79	0.21	223,756	154,412	69,344	0.69	0.31
1982	1,263,974	1,002,305	261,669	0.79	0.21	101,570	80,151	21,419	0.79	0.21
1983	1,389,118	1,085,429	303,798	0.78	0.22	125,253	83,124	42,129	0.66	0.34
1984	1,554,052	1,189,459	364,593	0.77	0.23	164,825	104,030	60,795	0.63	0.37
1985	1,671,392	1,261,580	409,812	0.75	0.25	117,340	72,121	45,219	0.61	0.39
1986	1,933,910	1,366,466	567,444	0.71	0.29	262,518	104,886	157,632	0.40	0.60
1987	2,177,416	1,537,782	639,634	0.71	0.29	243,506	171,316	72,190	0.70	0.30
1988	2,349,254	1,765,247	584,007	0.75	0.25	171,838	227,465	-55,627	1.32	-0.32
1989	2,610,132	2,070,811	539,321	0.79	0.21	260,878	305,564	-44,686	1.17	-0.17
1990	2,910,518	2,302,009	608,509	0.79	0.21	300,386	231,198	69,188	0.77	0.23
1991	3,288,882	2,554,494	734,338	0.78	0.22	378,361	252,485	125,879	0.67	0.33
1992	3,639,510	2,899,758	739,752	0.80	0.20	350,628	349,109	5,364	0.98	0.02
1993	4,031,880	3,226,019	805,861	0.80	0.20	392,370	349,109	66,109	0.83	0.17

Source: *Taiwan Statistical Data Book*, 1994.

ANNEX 16. PER CAPITA AVAILABILITY OF SELECTED FOOD ITEMS, 1980-1993
(Unit: Kg)

Year	Rice (Polished)	Vegetables	Fruits	Meat
1980	100.82	129.58	70.16	42.62
1981	96.54	115.60	80.51	42.99
1982	93.87	118.21	71.74	46.36
1983	90.32	116.61	68.42	44.16
1984	87.17	129.08	74.73	51.67
1985	85.97	127.07	82.01	54.30
1986	85.00	118.29	80.02	56.84
1987	78.18	125.35	93.91	57.69
1988	73.55	122.10	104.25	57.79
1989	69.66	117.55	108.03	60.30
1990	68.17	105.91	108.92	61.86
1991	67.56	114.44	107.15	63.48
1992	63.99	115.15	99.77	66.20

Source: *Taiwan Food Balance Sheet*, Council of Agriculture.
Note: Availability = Production + Imports - Exports $\pm$ Changes in Stocks - Losses and Shrinkages.

ANNEX 17. HARVESTED AREA AND PRODUCTION OF VEGETABLES AND FRUITS, 1981-1993

Year	Vegetables		Fruits	
	Harvested Area (1,000 ha)	Total Production (1,000 m.t.)	Harvested Areas (1,000 ha)	Total Production (1,000 m.t.)
1981	220	2,902	115	1,717
1982	226	3,044	115	1,598
1983	221	3,019	120	1,563
1984	230	3,416	126	1,749
1985	221	3,243	133	1,912
1986	226	3,128	145	1,838
1987	223	3,284	155	2,101
1988	214	3,094	182	2,364
1989	198	2,955	189	2,440
1990	184	2,713	191	2,327
1991	189	2,864	192	2,455
1992	185	2,825	196	2,276
1993	181	2,840	199	2,551

Source: *Taiwan Agriculture Yearbook*, Department of Agriculture and Forestry, Taiwan Provincial Government.

ANNEX 18. PRODUCTION OF FRUITS BY TYPE, 1993

Items	Production (1,000 m.t.)	%
Bananas	213	8.4
Pineapples	277	10.9
Citrus-Ponkans	163	6.4
Citrus-Tankans	75	2.9
Wentan Pomelos	53	2.1
Citrus-Liuchengs	140	5.5
Grape fruits	18	0.7
Longans	112	4.4
Mangos	217	8.5
Betel nuts	137	5.4
Guavas	109	4.3
Wax apples	106	4.2
Grapes	165	6.5
Lychees	98	3.8
Pears	107	4.2
Papayas	152	6.0
Others	409	16.0
Total	2,551	100.0

Source: *Taiwan Agricultural Yearbook*, 1994 Edition, Department of Agriculture and Forestry, Taiwan Provincial Government, June 1994.

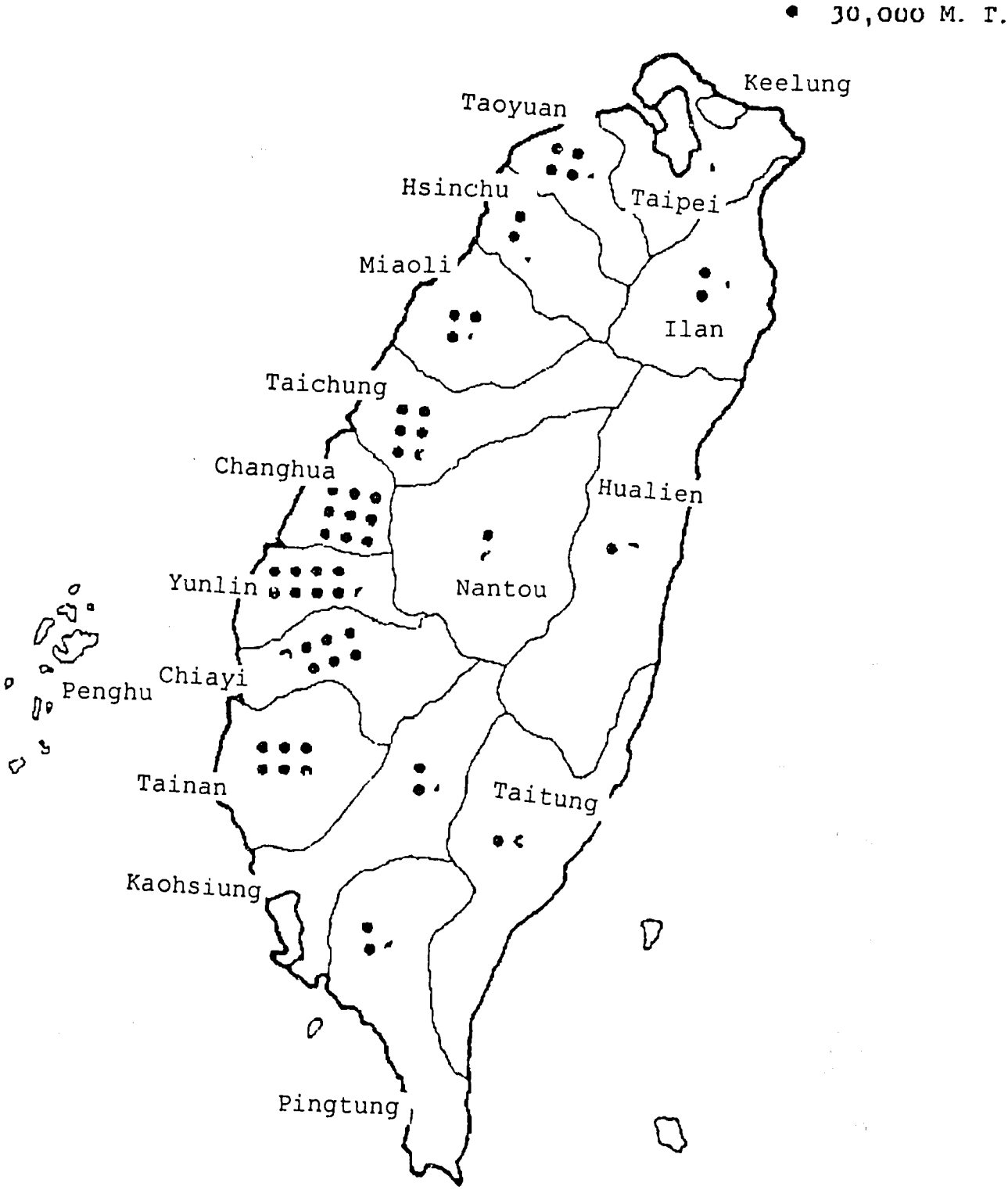
ANNEX 19. PRODUCTION OF VEGETABLES BY TYPE, 1993

Items	Production (1,000 m.t.)	%
Radishes	125	4.4
Carrots	124	4.3
Other Root Vegetables	19	0.7
Ginger	27	0.9
Taros	56	2.0
Scallion	81	2.9
Garlic Bulbs	54	1.9
Bamboo Shoot	395	13.9
Other Stem Vegetables	207	7.3
Cabbages	156	5.5
Chinese Cabbages	101	3.6
Leaf Mustard	67	2.4
Other Leafy Vegetables	301	10.6
Cauliflower	67	2.4
Tomatoes	144	5.1
Other Fruit Vegetables	376	13.1
Watermelon	351	12.3
Cantaloupe	121	4.3
Mushrooms and Others	68	2.4
Total	2,840	100.0

Source: *Taiwan Agricultural Yearbook*, 1994 edition, Department of Agriculture and Forestry, Taiwan Provincial Government, June 1994.

Annex 20 Production of Rice

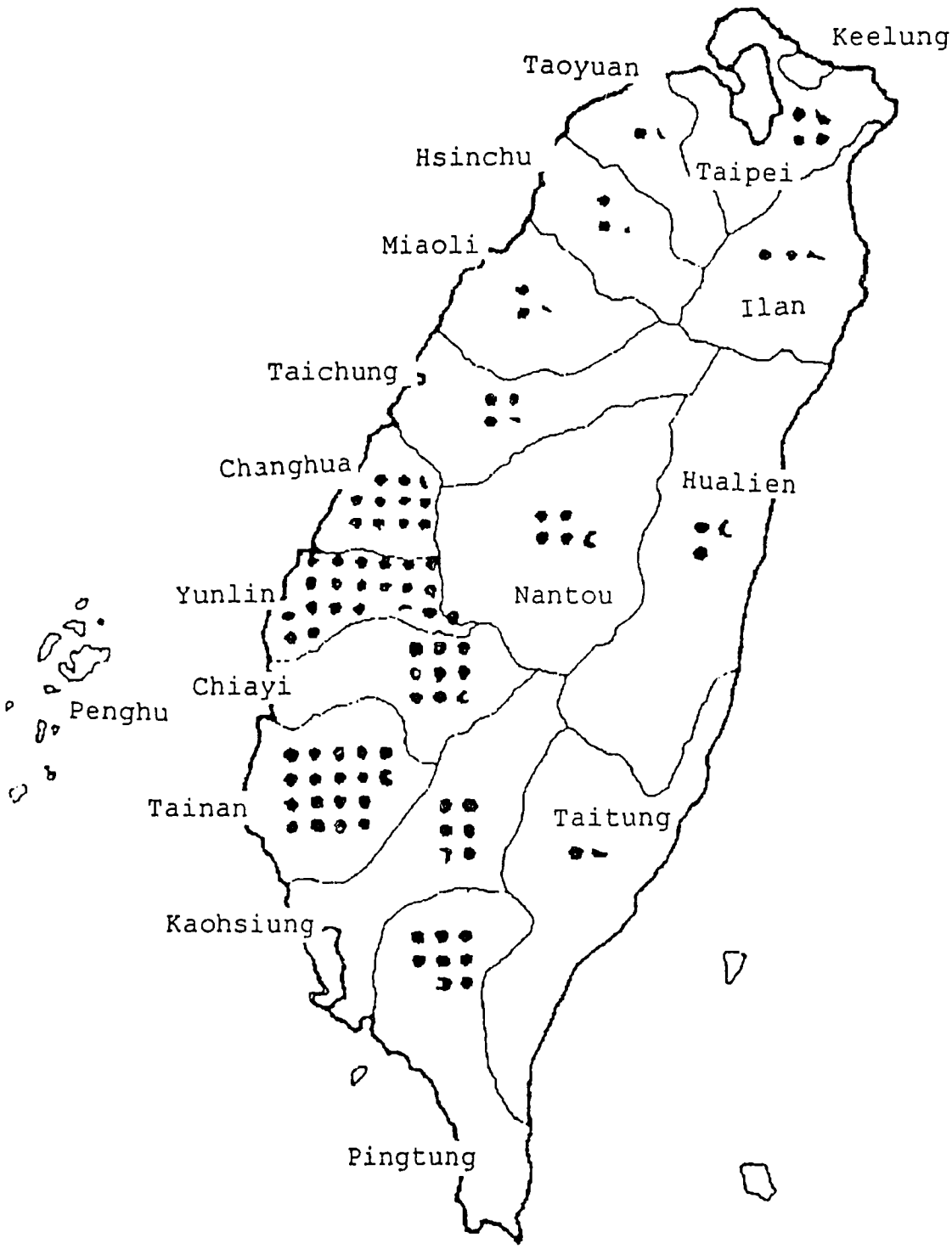
1993 Production : 1,820,000 M.T.



ANNEX 21. MAP OF VEGETABLE PRODUCTION AREAS, 1993

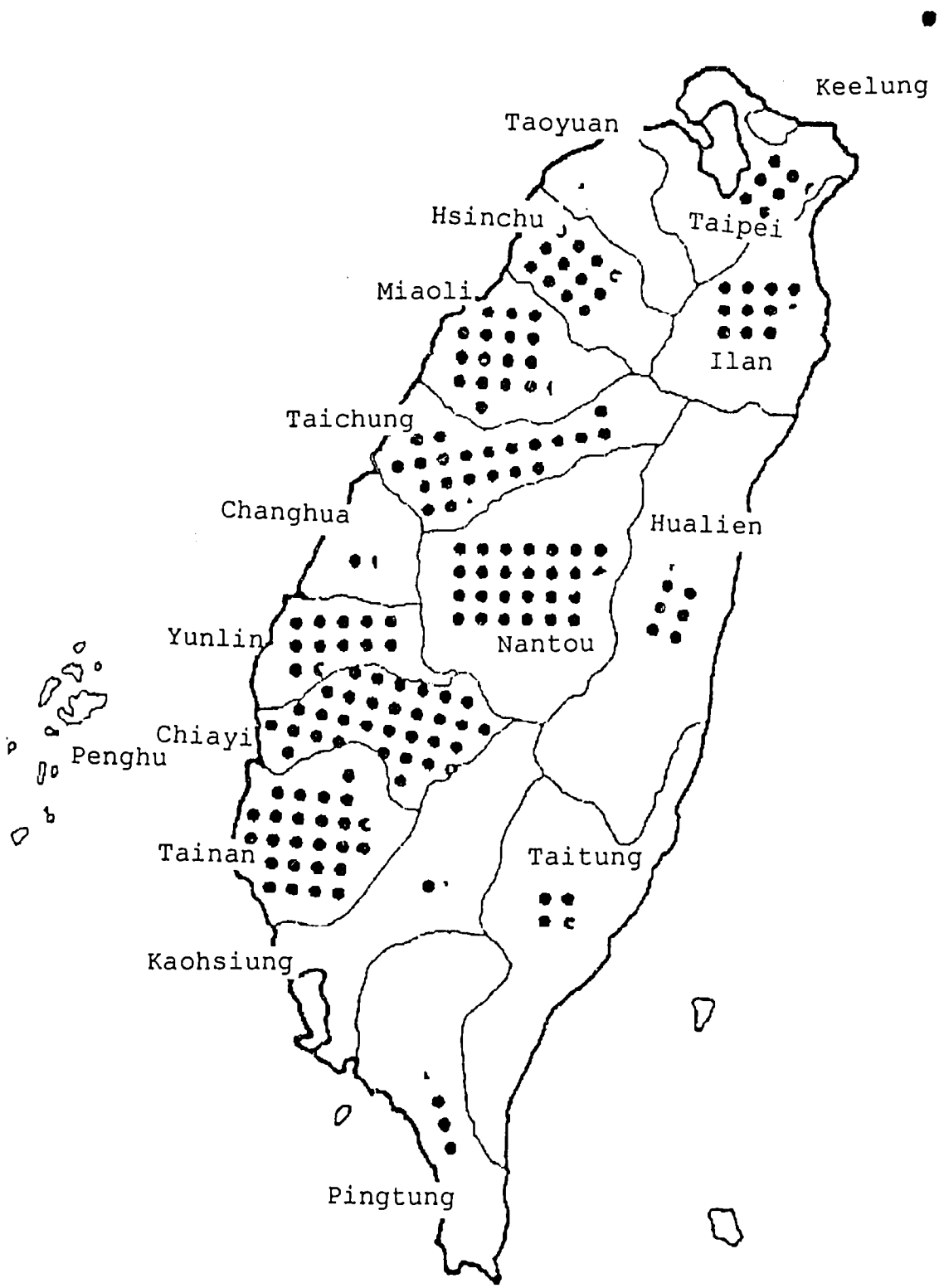
1993 Production : 2,840,316 M.T.

● 30,000 M. T.



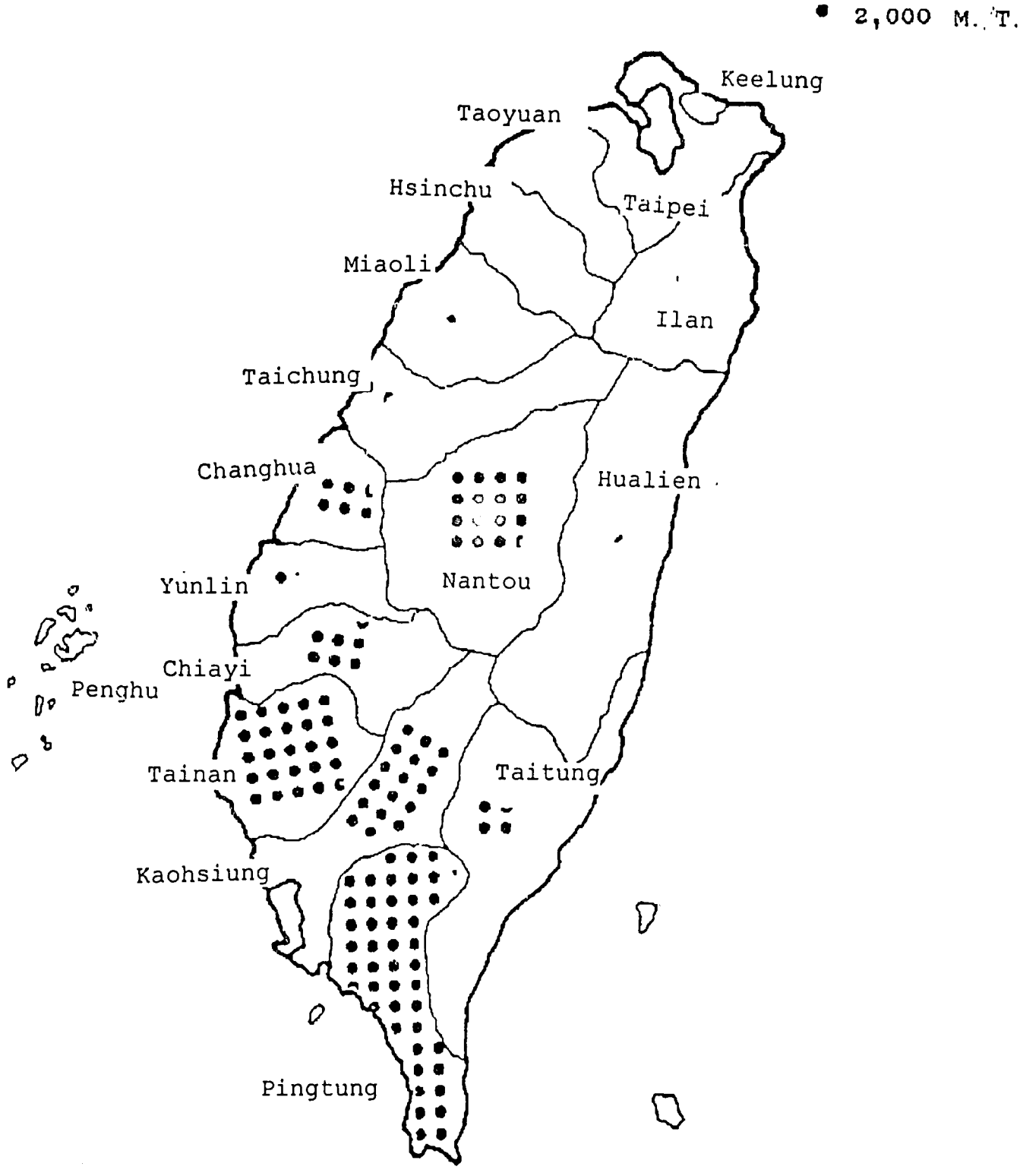
Annex 22 Production of Citrus Fruits

1993 Production : 506,681 M.T.



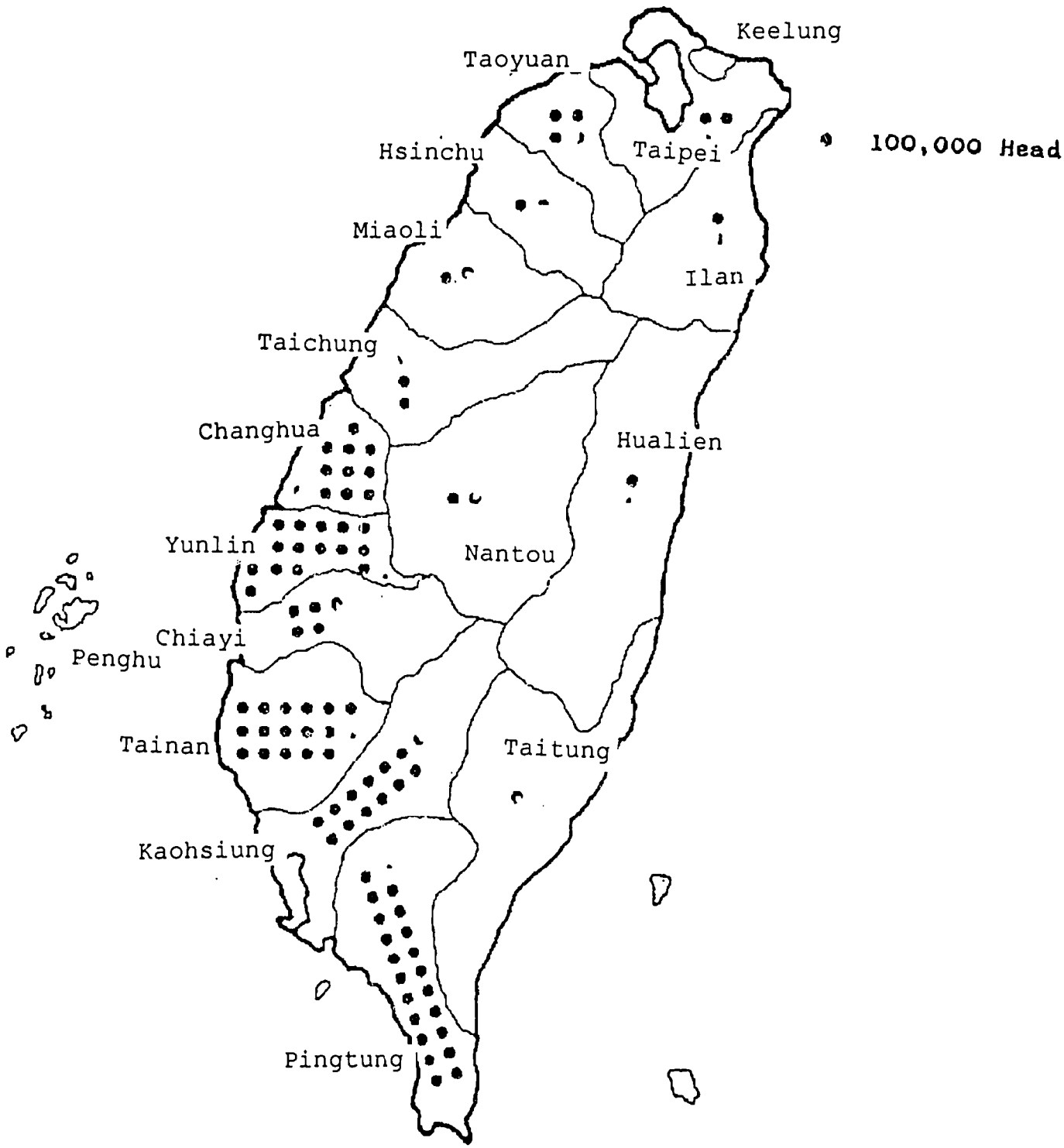
Annex 23 Production of Pineapples

1993 Production : 277,263 M.T.



Annex 24 Population of Hogs

1993 Production : 9,844,920 Head
(Year-end population)



ANNEX 25. VALUE OF AGRICULTURAL EXPORTS, IMPORTS, AND BALANCE OF TRADE, TAIWAN, 1980-1993
(Unit : US $1,000)

Year	Value of Exports		Value of Imports		Balance of Trade	
	Total (1)	Agricultural Products (2)	Total (3)	Agricultural Products (4)	Total (1)-(3)	Agricultural Products (2)-(4)
1980	19,810,618	1,879,137	19,733,135	3,085,748	77,483	-1,206,611
1981	22,611,197	1,955,024	21,199,551	3,494,154	1,411,646	-1,539,130
1982	22,204,270	1,853,787	18,888,375	3,252,279	3,315,895	-1,398,492
1983	25,122,747	1,934,955	20,287,078	3,451,553	4,835,669	-1,516,598
1984	30,456,390	1,061,387	21,959,086	3,792,841	8,497,304	-1,731,554
1985	30,725,662	2,107,330	20,102,049	3,380,512	10,623,613	-1,273,182
1986	39,861,504	2,855,337	24,181,460	3,730,092	15,680,044	-874,755
1987	53,678,748	3,640,174	34,983,380	4,868,070	18,695,368	-1,227,896
1988	60,668,362	3,792,109	49,672,800	5,842,238	10,994,562	-2,049,829
1989	66,303,952	3,598,983	52,265,326	5,975,223	14,038,626	-2,376,240
1990	67,214,446	3,487,108	54,716,004	5,867,174	12,498,442	-2,380,066
1991	76,178,309	4,043,571	62,860,545	6,631,283	13,317,764	-2,587,712
1992	81,470,250	4,002,664	72,006,794	7,112,084	9,465,456	-3,109,420
1993	84,916,602	4,100,080	77,061,203	7,328,568	7,855,399	-3,228,488

Source: *Agricultural Trade Statistics of Republic of China*, 1993, Council of Agriculture, Executive Yuan. April 1994.

ANNEX 26. VALUE OF EXPORTS, IMPORTS, AND BALANCE OF TRADE FOR FRESH AND PROCESSED VEGETABLES, 1985-1993
(Unit : US 1,000)

Year	Export (1)	Import (2)	Balance of Trade (1)-(2)
1985	389,806	12,391	377,414
1986	473,601	16,262	457,339
1987	484,709	26,387	458,322
1988	435,215	40,808	394,407
1989	439,405	42,380	397,025
1990	386,797	71,611	315,186
1991	363,268	75,289	287,979
1992	299,393	96,142	203,251
1993	263,306	100,323	162,983

Source: *Agricultural Trade Statistics of Republic of China*, 1993, Council of Agriculture, Executive Yuan, April 1994.

ANNEX 27. Volume of Exports, Imports, and Balance of Trade for Fresh and Processed Vegetables, 1985-93

(M.T.)

Year	Export (1)	Import (2)	Balance of Trade (1)-(2)
1985	528,814	37,499	491,315
1986	557,188	51,337	505,851
1987	486,818	59,190	427,628
1988	372,563	73,874	298,689
1989	362,822	86,124	276,698
1990	291,930	138,993	152,937
1991	276,983	148,095	128,888
1992	204,557	171,857	32,700
1993	169,721	197,366	-27,645

Source: Agricultural Trade Statistics of Republic of China, 1993, Council of Agriculture, Executive Yuan, April 1994.

Note: The Standard Classification of Commodities for the Republic of China was revised to adopt the Harmonized Commodity Description and Coding System, thus only data from 1985 onward are presented.

ANNEX 28. VALUE OF EXPORTS, IMPORTS, AND BALANCE OF TRADE FOR FRESH AND PROCESSED FRUITS, 1985-1993
(Unit: US $1,000)

Year	Export (1)	Import (2)	Balance (1)-(2)
1985	136,534	54,692	81,840
1986	145,396	71,962	73,434
1987	160,827	111,638	49,189
1988	173,745	175,301	-1,556
1989	196,119	227,597	-31,478
1990	146,900	256,645	-109,745
1991	188,451	240,812	-52,361
1992	179,697	321,217	-141,520
1993	169,414	292,778	-123,364

Source: *Agricultural Trade Statistics of Republic of China*, 1993, Council of Agriculture, Executive Yuan, April 1994.

ANNEX 29. Volume of Exports, Imports, and Balance of Trade for Fresh and Processed Fruits, 1985-93.

(M.T.)

Year	Export (1)	Import (2)	Balance of Trade (1)-(2)
1985	225,940	84,359	141,581
1986	198,974	119,249	79,725
1987	199,859	179,501	20,358
1988	199,083	205,576	-6,493
1989	180,603	223,802	-43,199
1990	129,196	250,643	-121,447
1991	164,093	247,089	-82,996
1992	169,612	330,943	-161,331
1993	147,511	334,616	-187,105

Source: Agricultural Trade Statistics of Republic of China, 1993, Council of Agriculture, Executive Yuan, April 1994.

Note: The Standard Classification of Commodities for the Republic of China was revised to adopt the Harmonized Commodity Description and Coding System, thus only data from 1985 onward are presented.

ANNEX 30. EXPORTS OF FRESH FRUITS BY TYPE AND THEIR DESTINATIONS (1993)

Items	Export Quantity (m.t.)	Destination of Shipment (%)
Bananas	66,121	Japan (95.9) Hong Kong (4.1)
Ponkang Oranges	20,632	Hong Kong (49.3) The Philippines (29.0) Singapore (9.5)
Lichees	6,989	Hong Kong (27.5) Canada (17.9) Japan (16.7)
Pineapples	1,262	Japan (100)
Tonkan Oranges	1,001	Singapore (81.6) Hong Kong (11.1).
Sweet Oranges	814	Singapore (61.8) Hong Kong (27.7)

Source: *Agricultural Trade Statistics of Republic of China*, 1993, Council of Agriculture, Executive Yuan, April 1994.

ANNEX 31. IMPORTS OF FRESH FRUITS BY TYPE AND MAJOR SOURCES OF SUPPLY (1993)

Items	Import Quantity (m.t.)'	Source of Supply (%)
Apples	106,917	USA (88.7) Chile (6.1) New Zealand (2.4)
Grape fruits	18,801	USA (97.5) South Africa (2.5)
Plums	15,521	USA (99.9)
Grapes	13,597	USA (100)
Oranges	13,072	USA (96.4) South Africa (3.6)
Kiwi fruit	8,132	New Zealand (56.8) USA (39.9)
Pears	5,575	USA (95.6) South Africa (3.5)
Coconut	4,937	The Philippines (96.1) Thailand (5.7)
Peaches	4,428	USA (90.4) New Zealand (5.7) South Africa (2.9)

Source: *Agricultural Trade Statistics of Republic of China*, 1993, Council of Agriculture, Executive Yuan, April 1994.

ANNEX 32. FOREIGN EXCHANGE RATES, 1965-1993

End of Month	Foreign Exchange of Rates (NT $ / US $	
	Buying	Selling
December 1965	40.00	40.10
December 1966	40.00	40.10
December 1667	40.00	40.10
December 1968	40.00	40.10
December 1969	40.00	40.10
December 1970	40.00	40.10
December 1971	40.00	40.10
December 1972	40.00	40.10
December 1973	37.90	38.10
December 1974	37.95	38.05
December 1975	37.95	38.05
December 1976	37.95	38.05
December 1977	37.95	38.05
December 1978	35.95	36.05
December 1979	35.98	36.08
December 1980	35.96	36.06
December 1981	37.79	37.89
December 1982	39.86	39.96
December 1983	40.22	40.32
December 1984	39.42	39.52
December 1985	39.80	39.90
December 1986	35.45	35.55
December 1987	28.50	28.60
December 1988	28.12	28.22
December 1989	26.12	26.22
December 1990	27.1075*	
December 1991	25.7475*	
December 1992	25.4025*	
December 1993	26.6260*	

* : Interbank Closing rates.
Source: *Financial Statistics Monthly*, Central Bank of China, R.O.C., April 1994.